

**FESTO**

## Product overview 2015



## Festo's entire product range on DVD-ROM



# FESTO

## Products

### Minimum system requirements

- Pentium IV, 2.4 GHz+ or AMD 2400 xp+
- 1 GB RAM
- DVD-ROM drive
- Screen resolution set to 1024 x 768 pixels
- Windows Vista SP2
- Internet Explorer 8

### Recommended configuration

- PC, no more than 4 years old
- Laptop, no more than 2 years old
- Dual-core CPU with 2 GHz
- 2 GB RAM
- DVD-ROM drive
- Screen resolution set to 1280 x 1024 pixels
- Windows 7/8/8.1 (32 or 64 bit) incl. all Windows updates

### Installation instructions

1. Insert the DVD-ROM into the drive. If the setup routine starts automatically, continue with Step 5.  
If not:
2. Select the **Run** command from the Start menu.
3. Enter the drive letter of your DVD-ROM drive followed by **setup.exe**.
4. For example: **d:\setup.exe**. Then click **OK** or **Enter**.
5. Follow the instructions.

For further information (installation in a network, FAQs), please read **Info\_en.pdf**.

### Exclusion of liability

Festo provides this software to support you in the selection and ordering of Festo products. The data/results generated using the

software are exclusively intended to describe the products and do not constitute warranted properties in any legal sense. Festo accepts no

liability for damages caused through the use of this software, in particular in relation to consequential damage, whether personal injury, material

damage or financial loss, directly related to the use of this DVD-ROM.

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## **Product overview 2015**

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Edition 11/2014

All technical data are correct at the time of going to print.

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All technical data are subject to change according to technical updates.

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**We are pneumatic.  
We are electric.  
We are 30,000 technology-neutral solutions.**

**→ WE ARE THE ENGINEERS  
OF PRODUCTIVITY.**

## Dear customers,

Any company wishing to be globally successful needs to systematically increase its competitive advantage. We can support you in achieving this by focusing on our shared goal of **improving your productivity.**

We want to make it as easy as possible for you to achieve this goal. One way we do this is with **selected products for automation.** In order to make you more productive.

At a glance for you:

- Fast: ready for dispatch in 24 hours
- Superb: Festo quality at an attractive price
- Easy: just 4 clicks to place an order

All these products that are easy to select and quick to order are marked with an asterisk.



Wherever you see this asterisk, you can count on the aforementioned advantages. That is our guarantee to you.

We recommend the following products:

- The individual valve VUVG, compact yet with very high flow rates
- The simple fieldbus connection CTEU, e.g. for the valve terminal VTUG
- The standard cylinder DSBC with the self-adjusting cushioning PPS
- The semi-rotary drive DRRD for extremely high loads

Thank you for your confidence in the Festo brand and our products. That is what motivates and drives us to make you even more successful. We take advantage of everything possible to make this happen – our knowledge, our capabilities, our performance. Place your trust in our experts, who apply four pillars to all your process and factory automation tasks:

**security, simplicity, efficiency and competency.**

Decide in favour of greater productivity!

We're there for you – we are the engineers of productivity!

Dr Ansgar Kriwet  
Board Member Sales

We drive automation for your success.  
We are your partner to inspire you.  
We shape the future together.

## → WE ARE THE ENGINEERS OF PRODUCTIVITY.

### **Maximum productivity for you and your customers – this is our mission.**

Our know-how, our holistic approach and our love of detail have made us a global leader in automation technology – and the world market leader in basic and further technical training.

With over 60 years' experience in factory and process automation, we are the right partner for you. Always able to provide an appropriate solution which is characterised by security, simplicity, efficiency and competency.

#### **Security**

We want you to feel secure during each and every phase of our collaboration. And confident that you are increasing your productivity. You can rely on our specialists as well as the quality of our products and processes wherever you are and whatever the situation. This is what we stand for as a family-run company with a long tradition in factory and process automation.

#### **Simplicity**

We make your work easier. From the first idea and product selection through to after sales. We reduce complexity with new product generations and software tools for quick product selection and configuration – simplicity is our philosophy. This gives you more time for the really important things: your core business and customers.

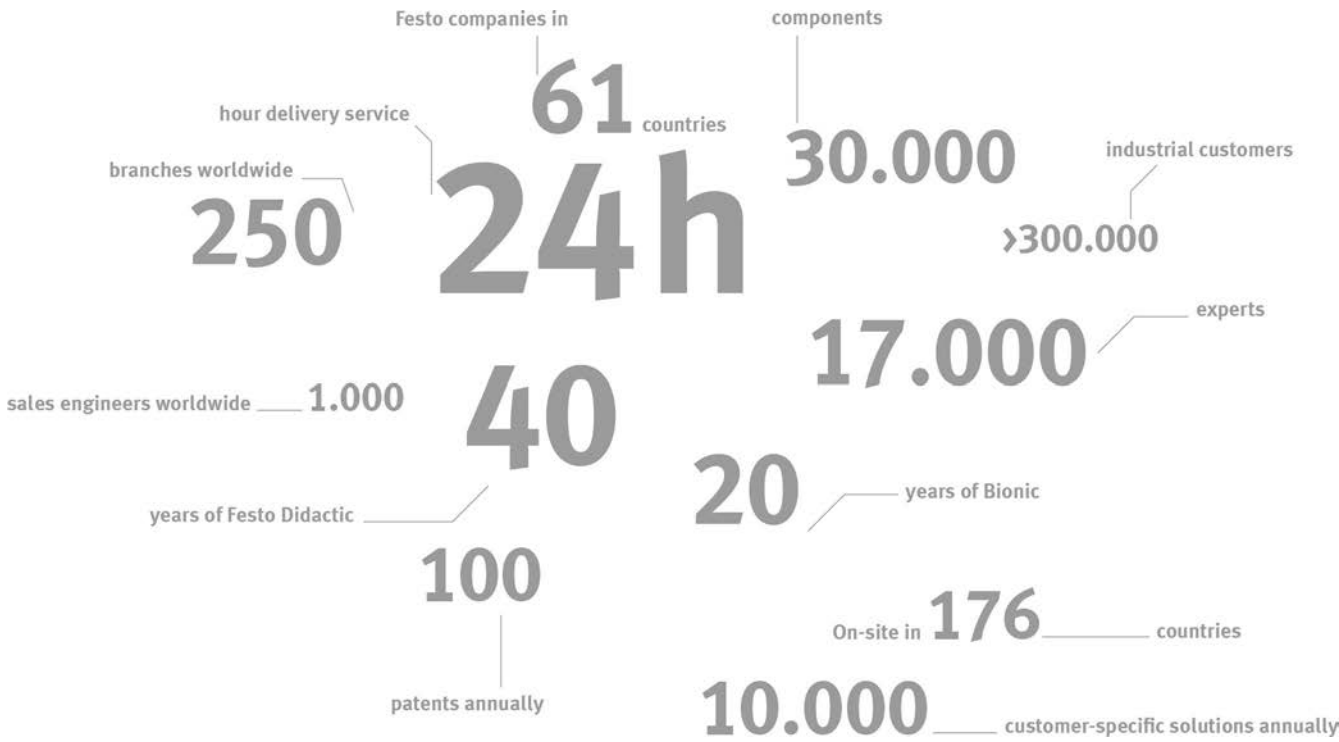
#### **Efficiency**

Save energy, materials and effort and reduce both your CO<sup>2</sup> emissions and your operating costs. With advice and services from Festo for tailored, economical and intelligent solutions. This is how you permanently increase the productivity of your company.

#### **Competency**

Work with experts who understand your industry. We have been setting trends in automation for decades. We smooth the way to maximum productivity with experience and dedication. Our experience is the key to your success: from consultation through to development, training, seminars and products. That is competency in action.







### It couldn't be simpler:

1. Select the product group you require from the Table of contents → 3  
For example: Electromechanical drives 41
2. Find the products you want on the product pages using the technical features and descriptions.
3. The blue arrow directs you to the search term with which you can find all product information and process your order on the Internet. Simply add the search term or type to the Internet address.  
For example, using search term → [www.festo.com/catalogue/spindleaxis](http://www.festo.com/catalogue/spindleaxis)  
For example, using type → [www.festo.com/catalogue/egc-bs](http://www.festo.com/catalogue/egc-bs)

Are you already in the product catalogue?

Enter the search term in the search field next to the magnifying glass.



You can also search offline. The electronic product catalogue can be found on the DVD inside the cover. Follow the installation instructions next to the DVD.

The electronic product catalogue offers additional productivity-boosting applications. See page 10 for more information.

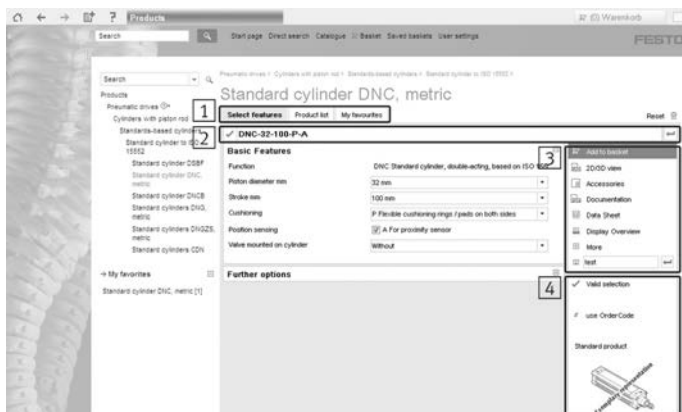
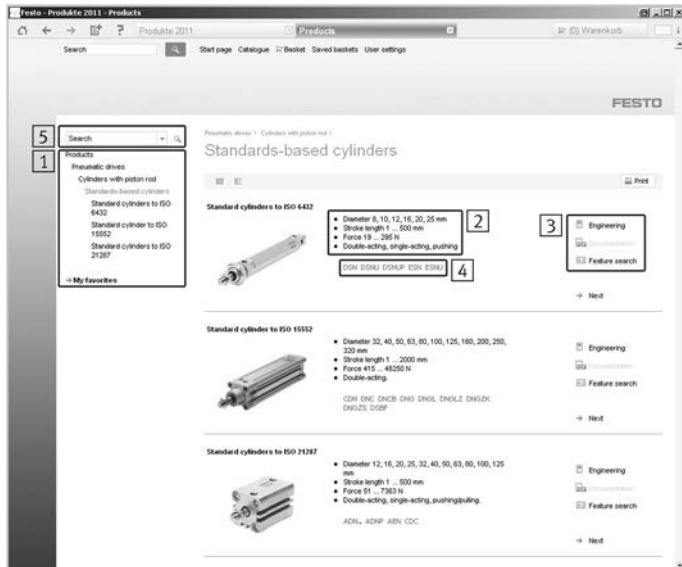
4. Should you require individually tailored advice, you can find contact details on the next page.



# Online or offline – get the ideal solution fast



Online: Enter → [www.festo.com](http://www.festo.com) in your web browser, then choose your country in the "Automation" field. Click on "Go".  
On the homepage, select the "Products" menu.



Offline: Insert the DVD and install the product catalogue.  
On the start page, click on the "Products" link.

## From the product group to the product

There are three options available:

1. Click on a product group [1] or a product photo. A selection of products will then be displayed along with a list [2] of the technical features and the selectable links [3]:
  - "Engineering" starts the selection and calculation software
  - "Documentation" provides detailed information in PDF format
  - "Feature search" lets you further narrow down the product selection
2. Full text search: Enter your search term in the search field [5]. This can be made up of complete or partial keywords, part numbers, type codes or names of favourites. Depending on your input, a selection of products as described in step 1. will be displayed or you will be taken directly to the product you searched for.
3. Quick link: Use the quick link [4] to take you directly to the required product by clicking on a type code.

## Functions in the product configurator

1. Tab navigation [1]:
  - "Select features": Select the appropriate features here
  - "Product list": Lists all products in the product group
2. Input field for type code [2]: Enter the exact type code here.
3. Other actions [3] which are available following a correct configuration:
  - "Add to basket": Adds your product to the basket, see also section "Exporting your basket" and "Managing your basket"
  - "2D/3D view": Creates a CAD model, see section "Viewing CAD models"
  - "Accessories": Lists suitable accessories
  - "Data Sheet": Contains all the relevant technical data
  - "Display Overview": Displays an overview of all selected models.
4. Details [4]: Here you will find information such as part number, price, product graphic, product illustration and circuit symbol.

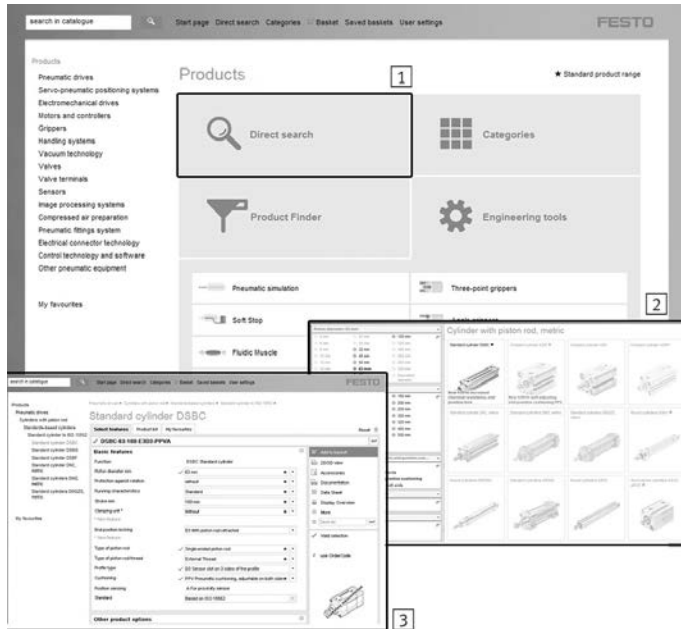
## Selecting product features in the product configurator

1. Select the product features:
  - Navigate using the tabs [1].
  - Configure your product by selecting the required features [2] on the tabs [1] running from left to right.
  - The tabs [1] give you a quick overview of all the selected features. Missing features are marked with a blue exclamation mark and incorrect features are marked in red. Clicking on the feature takes you directly to it, so that you can then change it.
2. Graphical representation [3]: A dynamic graphic (available for the valve terminal and service unit product groups) is created based on your current configuration.
3. Add the product to the basket: Once the configuration is complete, you can add products to the basket by clicking on "Add to basket". A message is displayed to confirm that the product has been added successfully. To find out how to place an order, see section "Managing your basket".

# Online or offline – get the ideal solution fast

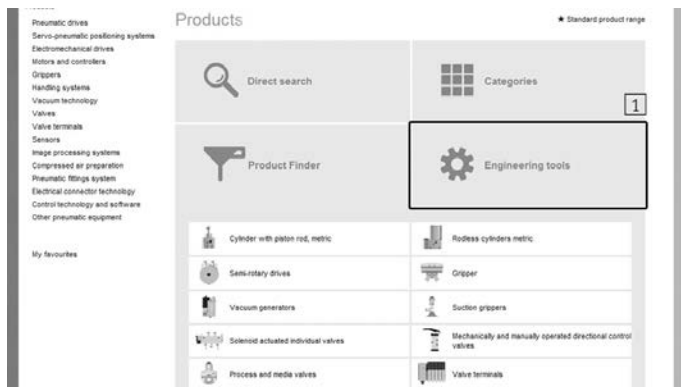
Online: Enter → [www.festo.com](http://www.festo.com) in your web browser, then choose your country in the "Automation" field. Click on "Go".  
On the homepage, select the "Products" menu.

Offline: Insert the DVD and install the product catalogue.  
On the start page, click on the "Products" link.



## Selecting product features in the product finder

1. Click on the blue button "Product finder" (1) and select the required product group.
2. Select the required technical features in the selection field (2) on the left-hand side.
3. Then click on a product photo. The configurator (3) opens with the features you selected.



## Engineering tools for appropriate products for your applications

1. Click on the blue button "Engineering" (1) and select the required engineering tool.
- This tool guides you step-by-step to the application simulation based on the technical features you selected and suggests the appropriate products for your application.



## Finding the appropriate accessories quickly

1. Select the required features in the configurator.
  2. Click on the "Accessories" button (1) on the right-hand side.
  3. Select the required accessory from the accessories on offer (2).
- The tool will bring you to the appropriate accessory selection list.

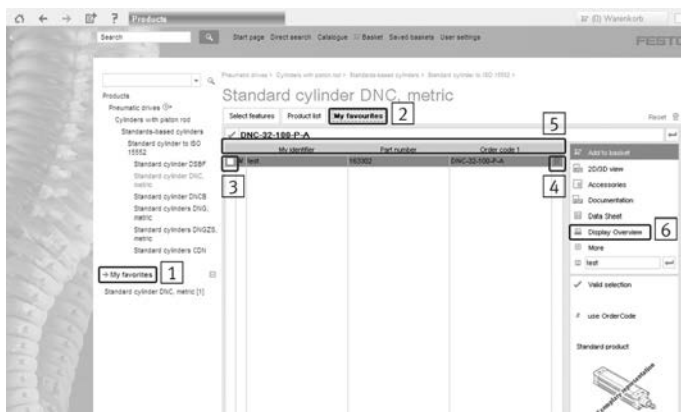
Tip:  
For some cylinder series you can find the appropriate accessories faster by selecting "Recommended accessories" in the accessories on offer (2).  
For some cylinder series you will also find "Recommended accessories" (3) after you have added your selection to the basket.

## Online or offline – get the ideal solution fast

FESTO

Online: Please register as a user to use the functions described on this page.

Offline: Registration is not required to use the functions on this page.



### My favourites

You can save as many product configurations as favourites as you want.

To display the list of all stored favourites [1]:

- Click on the "My favourites" tab [2]. A table containing your saved favourites is displayed. The name of the favourite, part number, type code and a button [4] for deleting the favourite are displayed.

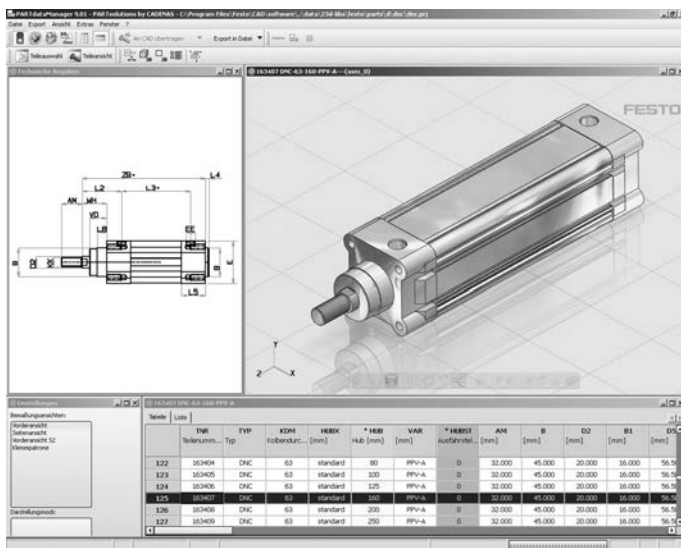
– Double-clicking on a row in the configuration opens the corresponding configuration window [3].

– You can sort your favourites by clicking on the column headings [5].

– You can select multiple favourites and compare them by clicking on "Product compare" in the field on the right [6].

### Viewing CAD models

Clicking on the "2D/3D view" button opens a window containing a CAD preview of the product. The "Export" function lets you export the files to your CAD system in the right format.



### Exporting your basket ...

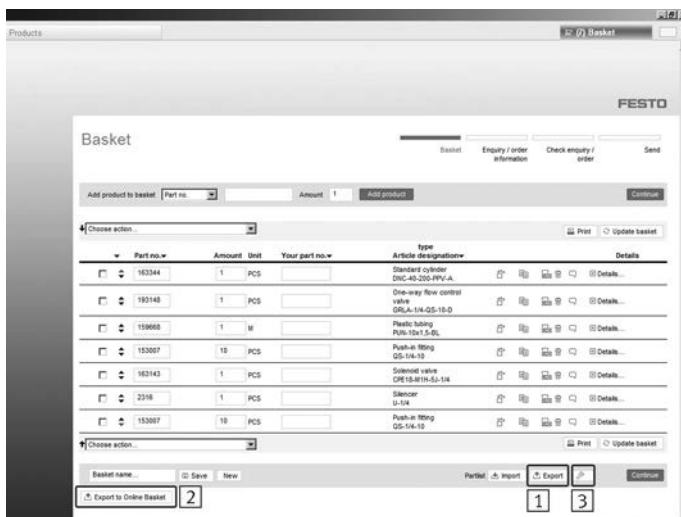
1. ... as a csv file:  
To do this, click "Export" [1], choose "Save as" in the new window and specify where you want to save it to. This file can then be opened in Excel, for example, and edited.
2. ... to your choice of format:  
To do this, click "Settings" [3] and specify which information is to be exported.

directly to the online shop, simply click on "Export to online basket" [2]. An Internet connection is established and the products are transferred to the online basket. After logging in via "Login", your net prices and delivery times are displayed. Now just place your order and you're done!

2. Place an order: To place an order, simply print out your basket and send it to Festo by fax or export it as an e-mail.

### Managing your basket

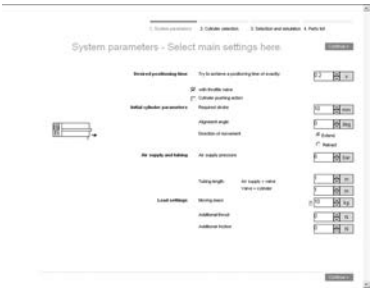

1. Upload the basket directly to the online shop and place your order: to upload a basket







### Online: The Support Portal

All product information can be accessed centrally → [www.festo.com/sp](http://www.festo.com/sp)

## Software tool





<p><b>Pneumatic simulation</b></p> 	<p>Perfect simulations replace expensive actual tests. The tool is an expert system that supports you in the selection and configuration of the entire pneumatic control chain. If one parameter is changed, the program automatically adapts all the others.</p>	<p>This tool can be found</p> <ul style="list-style-type: none"> <li>• either in the electronic catalogue by clicking on the blue button "Engineering"</li> <li>• or on the DVD under Engineering Tools.</li> </ul>
<p><b>Festo Design Tool 3D FDT 3D</b></p> 	<p>The Festo Design Tool 3D is a 3D product configurator for generating specific CAD product combinations from Festo. This configurator makes your search for the right accessory easier, more reliable and faster. You can then order the module that has been created with a single order code – either completely pre-assembled or as individual parts in a single box. As a result, your bill of materials is considerably shortened and downstream processes such as product ordering, order picking and assembly are significantly simplified.</p>	<p>All ordering options are available in the following countries: IT, IE, TR, DK, SE, NO, NL, FI, FR, DE, BE, CH, ES, GB, ZA, AT, SK, PL, CZ, HU, SI, RU.</p> <p>This tool can be found</p> <ul style="list-style-type: none"> <li>• either via the address: <a href="http://www.festo.com/FDT-3D">www.festo.com/FDT-3D</a> in the countries listed above,</li> <li>• or on the CD "FDT 3D" (part no. 135595 for the countries listed above)</li> <li>• or on the DVD.</li> </ul>

## Standards-based cylinders

Type	 <b>Compact cylinder ADN</b>	 <b>Compact cylinder AEN</b>	 <b>Compact cylinder ADNP</b>	 <b>Compact cylinder ADN-EL</b>
<b>Mode of operation</b>	Double-acting	pushing, single-acting, pulling	Double-acting	Double-acting
<b>Piston diameter</b>	12mm, 16mm, 20mm, 25mm, 32mm, 40mm, 50mm, 63mm, 80mm, 100mm, 125mm	12mm, 16mm, 20mm, 25mm, 32mm, 40mm, 50mm, 63mm, 80mm, 100mm	20mm, 25mm, 32mm, 40mm, 50mm	20mm, 25mm, 32mm, 40mm, 50mm, 63mm, 80mm, 100mm
<b>Theoretical force at 6 bar, advancing</b>	51 ... 7363 N	56 ... 4511 N	188 ... 1178 N	188 ... 4712 N
<b>Stroke</b>	1 ... 500 mm	1 ... 25 mm	5 ... 80 mm	10 ... 500 mm
<b>Cushioning</b>	P: elastic cushioning rings/pads at both ends, PPS: self-adjusting pneumatic end-position cushioning	P: elastic cushioning rings/pads at both ends	P: elastic cushioning rings/pads at both ends	P: elastic cushioning rings/pads at both ends
<b>Description</b>	<ul style="list-style-type: none"> <li>• Piston diameter 12 ... 100 mm in accordance with ISO 21287</li> <li>• Up to 50% less installation space than comparable standard cylinders to ISO 15552</li> <li>• For position sensing</li> <li>• Piston rod with male or female thread</li> <li>• Wide range of variants</li> </ul>	<ul style="list-style-type: none"> <li>• ISO 21287</li> <li>• Up to 50% less installation space than comparable standard cylinders to ISO 15552</li> <li>• For position sensing</li> <li>• Piston rod with male or female thread</li> <li>• Wide range of variants</li> </ul>	<ul style="list-style-type: none"> <li>• ISO 21287</li> <li>• Up to 50% less installation space than comparable standard cylinders to ISO 15552</li> <li>• With polymer end cap and piston rod made from aluminium</li> <li>• Low-cost cylinder for standard applications</li> <li>• For position sensing</li> <li>• Piston rod with male or female thread</li> </ul>	<ul style="list-style-type: none"> <li>• Standard hole pattern</li> <li>• With end-position locking at both ends, front or rear</li> <li>• For position sensing</li> <li>• Piston rod with male or female thread</li> </ul>
<b>online:</b> →	<a href="#">adn</a>	<a href="#">aen</a>	<a href="#">adnp</a>	<a href="#">adn-el</a>

## Standards-based cylinders





1

Type	 Compact cylinder, Clean Design CDC	 Standard cylinder DSBC	 Standard cylinder DSBG	 Standard cylinder, Clean Design DSBF
<b>Mode of operation</b>	Double-acting	Double-acting	Double-acting	Double-acting
<b>Piston diameter</b>	20mm, 25mm, 32mm, 40mm, 50mm, 63mm, 80mm	32mm, 40mm, 50mm, 63mm, 80mm, 100mm, 125mm	32mm, 40mm, 50mm, 63mm, 80mm, 100mm, 125mm, 160mm, 200mm	32mm, 40mm, 50mm, 63mm, 80mm, 100mm, 125mm
<b>Theoretical force at 6 bar, advancing</b>	141 ... 3016 N	415 ... 7363 N	415 ... 18850 N	415 ... 7363 N
<b>Stroke</b>	1 ... 500 mm	1 ... 2800 mm	1 ... 2800 mm	1 ... 2800 mm
<b>Cushioning</b>	P: elastic cushioning rings/pads at both ends	P: elastic cushioning rings/pads at both ends, PPS: self-adjusting pneumatic end-position cushioning, PPV: pneumatic cushioning, adjustable at both ends	P: elastic cushioning rings/pads at both ends, PPS: self-adjusting pneumatic end-position cushioning, PPV: pneumatic cushioning, adjustable at both ends	PPS: self-adjusting pneumatic end-position cushioning, PPV: pneumatic cushioning, adjustable at both ends, P: elastic cushioning rings/pads at both ends
<b>Description</b>	<ul style="list-style-type: none"> <li>• ISO 21287</li> <li>• Up to 50% less installation space than comparable standard cylinders to ISO 15552</li> <li>• Easy-to-clean design</li> <li>• Increased corrosion protection</li> <li>• For position sensing</li> <li>• Wide range of variants</li> <li>• Piston rod with male or female thread</li> </ul>	<ul style="list-style-type: none"> <li>• ISO 15552 (ISO 6431, VDMA 24562)</li> <li>• With the self-adjusting pneumatic end-position cushioning PPS - adapts perfectly to changes in load and speed</li> <li>• For position sensing</li> <li>• High flexibility thanks to the wide range of variants</li> <li>• An extensive range of accessories enables the cylinder to be installed virtually anywhere</li> </ul>	<ul style="list-style-type: none"> <li>• ISO 15552 (ISO 6431, VDMA 24562)</li> <li>• Sturdy tie rod design</li> <li>• For contactless position sensing</li> <li>• Optionally with protection against rotation</li> <li>• An extensive range of accessories enables the cylinder to be installed virtually anywhere</li> </ul>	<ul style="list-style-type: none"> <li>• ISO 15552 with increased corrosion protection</li> <li>• Resistant to conventional cleaning agents</li> <li>• FDA-approved lubrication and sealing on the basic version</li> <li>• Long service life thanks to optional seal for unlubricated operation</li> <li>• Hygienic mounting of the sensors possible</li> <li>• Comprehensive range of mounting accessories for just about every type of installation</li> </ul>
<b>online:</b> →	<a href="#">cdc</a>	<a href="#">dsbc</a>	<a href="#">dsbg</a>	<a href="#">dsbf-c</a>






## Standards-based cylinders

1





Type	 Standard cylinder DNC	 Standard cylinder DNG	 Standard cylinder DNGZS	 Standard cylinder DSNU
<b>Mode of operation</b>	Double-acting	Double-acting	Double-acting	Double-acting
<b>Piston diameter</b>	32mm, 40mm, 50mm, 63mm, 80mm, 100mm, 125mm	250mm, 320mm	250mm, 320mm	8mm, 10mm, 12mm, 16mm, 20mm, 25mm
<b>Theoretical force at 6 bar, advancing</b>	415 ... 7363 N	29450 ... 48250 N	29450 ... 48250 N	23 ... 295 N
<b>Stroke</b>	2 ... 2000 mm	1 ... 2000 mm	1 ... 1100 mm	1 ... 500 mm
<b>Cushioning</b>	P: elastic cushioning rings/pads at both ends, PPV: pneumatic cushioning, adjustable at both ends	PPV: pneumatic cushioning, adjustable at both ends	PPV: pneumatic cushioning, adjustable at both ends	P: elastic cushioning rings/pads at both ends, PPS: self-adjusting pneumatic end-position cushioning, PPV: pneumatic cushioning, adjustable at both ends
<b>Description</b>	<ul style="list-style-type: none"> <li>• ISO 15552 (ISO 6431, VDMA 24562)</li> <li>• For position sensing</li> <li>• Saves up to 11% on fitting space compared with ordinary standard cylinders</li> <li>• Wide range of variants</li> <li>• Profile slot for proximity sensors on three sides</li> <li>• No protruding proximity sensors</li> </ul>	<ul style="list-style-type: none"> <li>• ISO 15552 (ISO 6431, VDMA 24562)</li> <li>• Sturdy tie rod design</li> <li>• Proximity sensors mounted using kit</li> <li>• Wide range of accessories</li> </ul>	<ul style="list-style-type: none"> <li>• ISO 15552 (ISO 6431, VDMA 24562)</li> <li>• With fixed central trunnion mounting</li> <li>• Sturdy tie rod design</li> <li>• Proximity sensors mounted using kit</li> <li>• Wide range of accessories</li> </ul>	<ul style="list-style-type: none"> <li>• ISO 6432</li> <li>• For position sensing</li> <li>• Wide range of variants</li> <li>• Good running performance and long service life</li> <li>• Piston rod with male or female thread</li> </ul>
<b>online:</b> →	<a href="#">dnc</a>	<a href="#">dng</a>	<a href="#">dngzs</a>	<a href="#">dsnu</a>

## Standards-based cylinders



Type	 Standard cylinder ESNU	 Standard cylinder DSNUP	 Standard cylinder DSN, ESN
<b>Mode of operation</b>	pushing, single-acting	Double-acting	Double-acting, pushing, single-acting
<b>Piston diameter</b>	8mm, 10mm, 12mm, 16mm, 20mm, 25mm	16mm, 20mm, 25mm	8mm, 10mm, 12mm, 16mm, 20mm, 25mm
<b>Theoretical force at 6 bar, advancing</b>	19 ... 271 N	121 ... 295 N	24 ... 294.5 N
<b>Stroke</b>	1 ... 50 mm	25 ... 100 mm	1 ... 500 mm
<b>Cushioning</b>	P: elastic cushioning rings/pads at both ends	P: elastic cushioning rings/pads at both ends	P: elastic cushioning rings/pads at both ends, PPV: pneumatic cushioning, adjustable at both ends
<b>Description</b>	<ul style="list-style-type: none"> <li>• ISO 6432</li> <li>• For position sensing</li> <li>• Wide range of variants</li> <li>• Good running performance and long service life</li> <li>• Piston rod with male or female thread</li> </ul>	<ul style="list-style-type: none"> <li>• ISO 6432</li> <li>• Cost-optimised round cylinder</li> <li>• Wrought aluminium alloy cylinder barrel</li> <li>• Polyamide bearing and end caps</li> <li>• For position sensing</li> </ul>	<ul style="list-style-type: none"> <li>• ISO 6432</li> <li>• Good running performance and long service life</li> <li>• Piston rod with male or female thread</li> </ul>
<b>online:</b> →	<a href="#">esnu</a>	<a href="#">dsnup</a>	<a href="#">dsn</a>

## Round cylinders





1

Type	 <b>Round cylinder DSNU</b>	 <b>Round cylinder ESNU</b>	 <b>Standard cylinder DSNUP</b>	 <b>Standard cylinder DSN, ESN</b>
<b>Mode of operation</b>	Double-acting	pushing, single-acting	Double-acting	Double-acting, pushing, single-acting
<b>Piston diameter</b>	32mm, 40mm, 50mm, 63mm	32mm, 40mm, 50mm, 63mm	16mm, 20mm, 25mm	8mm, 10mm, 12mm, 16mm, 20mm, 25mm
<b>Theoretical force at 6 bar, advancing</b>	482.5 ... 1870.3 N	406 ... 1765 N	121 ... 295 N	24 ... 294.5 N
<b>Stroke</b>	1 ... 500 mm	1 ... 50 mm	25 ... 100 mm	1 ... 500 mm
<b>Cushioning</b>	P: elastic cushioning rings/pads at both ends, PPS: self-adjusting pneumatic end-position cushioning, PPV: pneumatic cushioning, adjustable at both ends	P: elastic cushioning rings/pads at both ends	P: elastic cushioning rings/pads at both ends	P: elastic cushioning rings/pads at both ends, PPV: pneumatic cushioning, adjustable at both ends
<b>Description</b>	<ul style="list-style-type: none"> <li>• For position sensing</li> <li>• Wide range of variants</li> <li>• Good running performance and long service life</li> <li>• Piston rod with male or female thread</li> </ul>	<ul style="list-style-type: none"> <li>• For position sensing</li> <li>• Wide range of variants</li> <li>• Good running performance and long service life</li> <li>• Piston rod with male or female thread</li> </ul>	<ul style="list-style-type: none"> <li>• ISO 6432</li> <li>• Cost-optimised round cylinder</li> <li>• Wrought aluminium alloy cylinder barrel</li> <li>• Polyamide bearing and end caps</li> <li>• For position sensing</li> </ul>	<ul style="list-style-type: none"> <li>• ISO 6432</li> <li>• Good running performance and long service life</li> <li>• Piston rod with male or female thread</li> </ul>
<b>online:</b> →	<a href="#">dsnu-32</a>	<a href="#">esnu-32</a>	<a href="#">dsnup</a>	<a href="#">dsn</a>

## Round cylinders





Type	 <b>Round cylinder DG, EG</b>	 <b>Round cylinder EG-PK</b>
<b>Mode of operation</b>	pushing, single-acting	pushing, single-acting
<b>Piston diameter</b>	2.5mm, 4mm, 6mm, 12mm, 16mm, 25mm	2.5mm, 4mm, 6mm
<b>Theoretical force at 6 bar, advancing</b>	1.9 ... 215 N	1.9 ... 11.8 N
<b>Stroke</b>	1 ... 80 mm	5... 25 mm
<b>Cushioning</b>	At one end, no cushioning, not adjustable	no cushioning
<b>Description</b>	<ul style="list-style-type: none"> <li>• Miniature cylinder</li> <li>• Good running performance</li> <li>• Piston rod with or without male thread</li> </ul>	<ul style="list-style-type: none"> <li>• Micro cylinder with supply port</li> <li>• Barbed fitting for plastic tubing with standard I.D.</li> </ul>
<b>online:</b> →	<a href="#">dg</a>	<a href="#">eg-pk</a>

## Stainless steel cylinders





Type	 Standard cylinder CRDSNU, CRDSNU-B	 Round cylinder CRDSNU, CRDSNU-B	 Standard cylinder CRDNG, CRDNGS	 Round cylinder CRHD
<b>Mode of operation</b>	Double-acting	Double-acting	Double-acting	Double-acting
<b>Piston diameter</b>	12mm, 16mm, 20mm, 25mm	32mm, 40mm, 50mm, 63mm	32mm, 40mm, 50mm, 63mm, 80mm, 100mm, 125mm	32mm, 40mm, 50mm, 63mm, 80mm, 100mm
<b>Theoretical force at 6 bar, advancing</b>	68 ... 295 N	483 ... 1870 N	483 ... 7363 N	483 ... 4712 N
<b>Stroke</b>	1 ... 500 mm	1 ... 500 mm	10 ... 2000 mm	10 ... 500 mm
<b>Cushioning</b>	P: elastic cushioning rings/pads at both ends, PPS: self-adjusting pneumatic end-position cushioning, PPV: pneumatic cushioning, adjustable at both ends	P: elastic cushioning rings/pads at both ends, PPS: self-adjusting pneumatic end-position cushioning, PPV: pneumatic cushioning, adjustable at both ends	PPV: pneumatic cushioning, adjustable at both ends	PPV: pneumatic cushioning, adjustable at both ends
<b>Description</b>	<ul style="list-style-type: none"> <li>• ISO 6432</li> <li>• Corrosion-resistant in harsh environmental conditions</li> <li>• Easy-to-clean design</li> <li>• Long service life thanks to optional unlubricated seal</li> <li>• For position sensing</li> <li>• Wide range of variants</li> <li>• Wide range of accessories</li> </ul>	<ul style="list-style-type: none"> <li>• Corrosion-resistant in harsh environmental conditions</li> <li>• Easy-to-clean design</li> <li>• Long service life thanks to optional unlubricated seal</li> <li>• For position sensing</li> <li>• Wide range of variants</li> <li>• Wide range of accessories</li> </ul>	<ul style="list-style-type: none"> <li>• ISO 15552 (ISO 6431, VDMA 24562)</li> <li>• Corrosion-resistant in harsh environmental conditions</li> <li>• Easy-to-clean design</li> <li>• Threaded mounting, mounting via accessories</li> <li>• For position sensing</li> <li>• Variants: through piston rod, heat-resistant design</li> </ul>	<ul style="list-style-type: none"> <li>• Corrosion-resistant in harsh environmental conditions</li> <li>• Easy-to-clean design, optimised for exacting demands</li> <li>• Greater flexibility thanks to different end caps</li> <li>• For position sensing</li> <li>• Piston rod with male thread</li> </ul>
<b>online:</b> →	<a href="#">crdsnu-12</a>	<a href="#">crdsnu-32</a>	<a href="#">crdng</a>	<a href="#">crhd</a>

## Compact, short-stroke and flat cylinders





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Type	 Compact cylinder ADN	 Compact cylinder AEN	 Compact cylinder ADNGF	 Compact cylinder ADNP
<b>Mode of operation</b>	Double-acting	pushing, single-acting, pulling	Double-acting	Double-acting
<b>Piston diameter</b>	12mm, 16mm, 20mm, 25mm, 32mm, 40mm, 50mm, 63mm, 80mm, 100mm, 125mm	12mm, 16mm, 20mm, 25mm, 32mm, 40mm, 50mm, 63mm, 80mm, 100mm	12mm, 16mm, 20mm, 25mm, 32mm, 40mm, 50mm, 63mm, 80mm, 100mm	20mm, 25mm, 32mm, 40mm, 50mm
<b>Theoretical force at 6 bar, advancing</b>	51 ... 7363 N	56 ... 4511 N	68 ... 4712 N	188 ... 1178 N
<b>Stroke</b>	1 ... 500 mm	1 ... 25 mm	1 ... 400 mm	5 ... 80 mm
<b>Cushioning</b>	P: elastic cushioning rings/pads at both ends, PPS: self-adjusting pneumatic end-position cushioning	P: elastic cushioning rings/pads at both ends	P: elastic cushioning rings/pads at both ends, PPS: self-adjusting pneumatic end-position cushioning	P: elastic cushioning rings/pads at both ends
<b>Description</b>	<ul style="list-style-type: none"> <li>• Piston diameter 12 ... 100 mm in accordance with ISO 21287</li> <li>• Up to 50% less installation space than comparable standard cylinders to ISO 15552</li> <li>• For position sensing</li> <li>• Piston rod with male or female thread</li> <li>• Wide range of variants</li> </ul>	<ul style="list-style-type: none"> <li>• ISO 21287</li> <li>• Up to 50% less installation space than comparable standard cylinders to ISO 15552</li> <li>• For position sensing</li> <li>• Piston rod with male or female thread</li> <li>• Wide range of variants</li> </ul>	<ul style="list-style-type: none"> <li>• Mounting hole pattern to ISO 21287</li> <li>• Piston rod secured against rotation by means of guide rod and yoke plate</li> <li>• Plain-bearing guide</li> <li>• For position sensing</li> <li>• Available with through piston rod</li> </ul>	<ul style="list-style-type: none"> <li>• ISO 21287</li> <li>• Up to 50% less installation space than comparable standard cylinders to ISO 15552</li> <li>• With polymer end cap and piston rod made from aluminium</li> <li>• Low-cost cylinder for standard applications</li> <li>• For position sensing</li> <li>• Piston rod with male or female thread</li> </ul>
<b>online:</b> →	<a href="#">adn</a>	<a href="#">aen</a>	<a href="#">adngf</a>	<a href="#">adnp</a>

## Compact, short-stroke and flat cylinders




Type	 Compact cylinder ADN-EL	 Compact cylinder CDC	 Short-stroke cylinder ADVC, AEVC	 Compact cylinder ADVU, AEVU, AEVUZ
<b>Mode of operation</b>	Double-acting	Double-acting	Double-acting, pushing, single-acting	Double-acting, pushing, single-acting, pulling
<b>Piston diameter</b>	20mm, 25mm, 32mm, 40mm, 50mm, 63mm, 80mm, 100mm	20mm, 25mm, 32mm, 40mm, 50mm, 63mm, 80mm	4mm, 6mm, 10mm, 12mm, 16mm, 20mm, 25mm, 32mm, 40mm, 50mm, 63mm, 80mm, 100mm	12mm, 16mm, 20mm, 25mm, 32mm, 40mm, 50mm, 63mm, 80mm, 100mm, 125mm
<b>Theoretical force at 6 bar, advancing</b>	188 ... 4712 N	141 ... 3016 N	4.9 ... 4712 N	42 ... 7363 N
<b>Stroke</b>	10 ... 500 mm	1 ... 500 mm	2.5 ... 25 mm	1 ... 2000 mm
<b>Cushioning</b>	P: elastic cushioning rings/pads at both ends	P: elastic cushioning rings/pads at both ends	P: elastic cushioning rings/pads at both ends	P: elastic cushioning rings/pads at both ends
<b>Description</b>	<ul style="list-style-type: none"> <li>Standard hole pattern</li> <li>With end-position locking at both ends, front or rear</li> <li>For position sensing</li> <li>Piston rod with male or female thread</li> </ul>	<ul style="list-style-type: none"> <li>ISO 21287</li> <li>Up to 50% less installation space than comparable standard cylinders to ISO 15552</li> <li>Easy-to-clean design</li> <li>Increased corrosion protection</li> <li>For position sensing</li> <li>Wide range of variants</li> <li>Piston rod with male or female thread</li> </ul>	<ul style="list-style-type: none"> <li>Short-stroke cylinder with standard hole pattern to VDMA 24562 from diameter 32 mm</li> <li>Minimal space required</li> <li>High clamping forces in a compact size</li> <li>For position sensing with proximity sensor for T-slot and for C-slot</li> <li>Piston rod with male or female thread</li> </ul>	<ul style="list-style-type: none"> <li>50% less installation space than comparable standard cylinders to ISO 15552</li> <li>For position sensing</li> <li>Wide range of variants</li> <li>Piston rod with male or female thread</li> </ul>
<b>online:</b> →	<a href="#">adn-el</a>	<a href="#">cdc</a>	<a href="#">advc</a>	<a href="#">advu</a>

## Compact, short-stroke and flat cylinders





Type	 Compact cylinder ADVUL	 Flat cylinder DZF	 Flat cylinder DZH	 Flat cylinder EZH
<b>Mode of operation</b>	Double-acting	Double-acting	Double-acting	pushing, single-acting
<b>Piston diameter</b>	12mm, 16mm, 20mm, 25mm, 32mm, 40mm, 50mm, 63mm, 80mm, 100mm	Equivalentdiameter, 12mm, 18mm, 25mm, 32mm, 40mm, 50mm, 63mm	Equivalentdiameter, 16mm, 20mm, 25mm, 32mm, 40mm, 50mm, 63mm	Equivalentdiameter, 3mm, 6mm, 12mm, 22mm
<b>Theoretical force at 6 bar, advancing</b>	51 ... 4712 N	51 ... 1870 N	104 ... 1870 N	3.8 ... 205 N
<b>Stroke</b>	1 ... 400 mm	1 ... 320 mm	1 ... 1000 mm	10 ... 50 mm
<b>Cushioning</b>	P: elastic cushioning rings/pads at both ends	P: elastic cushioning rings/pads at both ends	PPV: pneumatic cushioning, adjustable at both ends	no cushioning
<b>Description</b>	<ul style="list-style-type: none"> <li>Piston rod secured against rotation by means of guide rod and yoke plate</li> <li>For position sensing</li> <li>Plain-bearing guide</li> <li>For position sensing</li> <li>Available with through piston rod</li> </ul>	<ul style="list-style-type: none"> <li>Extremely flat design</li> <li>Protected against rotation thanks to special piston shape</li> <li>Ideal for manifold assembly</li> <li>Wide range of mounting options</li> <li>For position sensing</li> <li>Piston rod with male or female thread</li> </ul>	<ul style="list-style-type: none"> <li>Flat design</li> <li>Protected against rotation thanks to special piston shape</li> <li>Ideal for manifold assembly</li> <li>Wide range of mounting options</li> <li>For position sensing</li> <li>Piston rod with male thread</li> </ul>	<ul style="list-style-type: none"> <li>Extremely flat design</li> <li>Protected against rotation thanks to special piston shape</li> <li>Wide range of mounting options</li> <li>For position sensing</li> </ul>
<b>online:</b> →	<a href="#">advul</a>	<a href="#">dzf</a>	<a href="#">dzh</a>	<a href="#">ezh</a>

## Cartridge cylinders and multimount cylinders


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Type	 Multimount cylinder DMM, EMM, DMML, EMLL	 Cartridge cylinder EGZ	 Flanged cylinder DFK, EFK
<b>Mode of operation</b>	Double-acting, pushing, single-acting	pushing, single-acting	Double-acting, single-acting, pushing
<b>Piston diameter</b>	10mm, 16mm, 20mm, 25mm, 32mm	6mm, 10mm, 16mm	8 mm, 10 mm, 12 mm, 16 mm, 20 mm, 25 mm
<b>Theoretical force at 6 bar, advancing</b>	37 ... 483 N	13.9 ... 109 N	30 ... 295 N
<b>Stroke</b>	1 ... 50 mm	5 ... 15 mm	10 ... 80 mm
<b>Cushioning</b>	P: elastic cushioning rings/pads at both ends	no cushioning	P: elastic cushioning rings/pads at both ends
<b>Description</b>	<ul style="list-style-type: none"> <li>Wide range of mounting options</li> <li>Wide selection of piston rod variants</li> <li>For position sensing</li> <li>Piston rod with male thread</li> </ul>	<ul style="list-style-type: none"> <li>Minimal fitting space</li> <li>Installation with or without mounting components</li> <li>Piston rod with male thread</li> </ul>	<ul style="list-style-type: none"> <li>Polymer design</li> <li>Integrated mounting flange and connection</li> <li>Piston rod with male thread</li> </ul>
<b>online:</b> →	<a href="#">dmm</a>	<a href="#">egz</a>	<a href="#">dfk</a>





## Cylinder with clamping unit

Type	 Compact cylinder with clamping unit ADN-KP	 Standard cylinder with clamping cartridge DSNU-KP	 Round cylinder with clamping cartridge DSNU-KP	 Standard cylinder with clamping cartridge DNC-KP
<b>Mode of operation</b>	Double-acting	Double-acting	Double-acting	Double-acting
<b>Piston diameter</b>	20mm, 25mm, 32mm, 40mm, 50mm, 63mm, 80mm, 100mm	8mm, 10mm, 12mm, 16mm, 20mm, 25mm	32mm, 40mm, 50mm, 63mm	32mm, 40mm, 50mm, 63mm, 80mm, 100mm, 125mm
<b>Theoretical force at 6 bar, advancing</b>	188... 4712 N	30 ... 295 N	482.5 ... 1870.3 N	415 ... 7363 N
<b>Stroke</b>	10 ... 500 mm	1 ... 500 mm	1 ... 500 mm	10 ... 2000 mm
<b>Cushioning</b>	P: elastic cushioning rings/pads at both ends	P: elastic cushioning rings/pads at both ends, PPS: self-adjusting pneumatic end-position cushioning, PPV: pneumatic cushioning, adjustable at both ends	P: elastic cushioning rings/pads at both ends, PPS: self-adjusting pneumatic end-position cushioning, PPV: pneumatic cushioning, adjustable at both ends	P: elastic cushioning rings/pads at both ends, PPV: pneumatic cushioning, adjustable at both ends
<b>Description</b>	<ul style="list-style-type: none"> <li>Mounting hole pattern to ISO 21287</li> <li>Piston rod can be held or clamped in any position during clamping, processing or handling operations</li> <li>For position sensing</li> <li>Piston rod with male or female thread</li> </ul>	<ul style="list-style-type: none"> <li>Mounting hole pattern to ISO 6432</li> <li>Piston rod can be held or clamped in any position</li> <li>Piston rod can be held in position for long periods even with alternating loads, fluctuating operating pressure or leaks in the system</li> <li>For position sensing</li> </ul>	<ul style="list-style-type: none"> <li>Piston rod can be held or clamped in any position</li> <li>Piston rod can be held in position for long periods even with alternating loads, fluctuating operating pressure or leaks in the system</li> <li>For position sensing</li> </ul>	<ul style="list-style-type: none"> <li>Piston rod can be held or clamped in any position</li> <li>Piston rod can be held in position for long periods even with alternating loads, fluctuating operating pressure or leaks in the system</li> <li>Mounting hole pattern to ISO 15552</li> <li>For position sensing</li> <li>Wide range of variants</li> <li>Piston rod with male or female thread</li> </ul>
<b>online:</b> →	<a href="#">adn-kp</a>	<a href="#">dsnu-kp</a>	<a href="#">dsnu-kp</a>	<a href="#">dnc-kp</a>

## Cylinder with clamping unit




Type	 <p><b>Cylinders with clamping unit</b> DNCKE, DNCKE-S</p>
Mode of operation	Double-acting
Piston diameter	40mm, 63mm, 100mm
Theoretical force at 6 bar, advancing	754 ... 4712 N
Stroke	10 ... 2000 mm
Cushioning	PPV: pneumatic cushioning, adjustable at both ends
Description	<ul style="list-style-type: none"> <li>• Cylinder for holding, clamping and braking</li> <li>• Mounting hole pattern to ISO 15552</li> <li>• Variant DNCKE-...-S approved for use in safety-oriented parts of control systems</li> <li>• Piston rod can be clamped in any position</li> <li>• For position sensing</li> <li>• Piston rod with male thread</li> </ul>
online: →	<a href="#">dncke</a>

## Rodless cylinders


Type	 <p><b>Linear drive</b> DGC-K</p>	 <p><b>Linear drive</b> DGC-G, DGC-GF, DGC-KF</p>	 <p><b>Linear drive with heavy-duty guide</b> DGC-HD</p>	 <p><b>Linear drive</b> SLG</p>
Piston diameter	18mm, 25mm, 32mm, 40mm, 50 mm, 63 mm, 80 mm	8mm, 12mm, 18mm, 25mm, 32mm, 40mm, 50mm, 63mm	18mm, 25mm, 40mm	8mm, 12mm, 18mm
Theoretical force at 6 bar, advancing	153 ... 3016 N	30 ... 1870 N	153 ... 754 N	30 ... 153 N
Stroke	1 ... 8500 mm	1 ... 8500 mm	1 ... 5000 mm	100 ... 900 mm
Cushioning	PPV: pneumatic cushioning, adjustable at both ends	P: elastic cushioning rings/pads at both ends, PPV: pneumatic cushioning, adjustable at both ends, YSR: shock absorber, hard characteristic curve, YSRW: shock absorber, soft characteristic curve	YSR: shock absorber, hard characteristic curve, YSRW: shock absorber, soft characteristic curve	P: elastic cushioning rings/pads at both ends, YSR: shock absorber, hard characteristic curve
Position sensing	via proximity sensor	via proximity sensor	via proximity sensor	via proximity sensor
Description	<ul style="list-style-type: none"> <li>• Compact design: 30% smaller than basic design DGC-G</li> <li>• Low moving dead weight</li> <li>• Without external guide, for simple drive functions</li> <li>• Easy assembly and installation</li> <li>• Fully interchangeable with the linear drive DGP</li> </ul>	<ul style="list-style-type: none"> <li>• Basic design, plain or recirculating ball bearing guides</li> <li>• Optimised mounting options</li> <li>• High-precision guide</li> <li>• Optimised sealing system</li> <li>• All settings accessible from one side</li> <li>• Available with variable end stops and intermediate position module</li> <li>• Exchangeable with DGPL thanks to foot mountings</li> <li>• Software tool available for bearing calculation</li> <li>• Optional: NSF-H1 lubricant for the food industry</li> <li>• Optional: clamping unit for holding loads</li> </ul>	<ul style="list-style-type: none"> <li>• For maximum loads and torques thanks to duo rail guide</li> <li>• Very good operating performance under torque load</li> <li>• Long service life</li> <li>• Ideal as a basic axis for linear gantries and cantilever axes</li> <li>• Excellent price/performance ratio</li> <li>• Wide range of options for mounting on drives</li> </ul>	<ul style="list-style-type: none"> <li>• Extremely flat design</li> <li>• Integrated precision guide</li> <li>• Adjustable end stops</li> <li>• Choice of supply ports</li> <li>• Available with intermediate position module</li> </ul>
online: →	<a href="#">dgc-k</a>	<a href="#">dgc</a>	<a href="#">dgc</a>	<a href="#">slg</a>

## Rodless cylinders

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Type	 <b>Linear drive DGPL</b>	 <b>Linear drive DGO</b>	 <b>Linear drive SLM</b>
<b>Piston diameter</b>	18mm, 25mm, 32mm, 40mm, 50mm, 63mm, 80mm	12mm, 16mm, 20mm, 25mm, 32mm, 40mm	12mm, 16mm, 20mm, 25mm, 32mm, 40mm
<b>Theoretical force at 6 bar, advancing</b>	153 ... 3016 N	68 ... 754 N	68 ... 754 N
<b>Stroke</b>	10 ... 3000 mm	10 ... 4000 mm	10 ... 1500 mm
<b>Cushioning</b>	PPV: pneumatic cushioning, adjustable at both ends, YSR: shock absorber, hard characteristic curve	P: elastic cushioning rings/pads at both ends, PPV: pneumatic cushioning, adjustable at both ends	P: elastic cushioning rings/pads at both ends, YSR: shock absorber, hard characteristic curve
<b>Position sensing</b>	via proximity sensor, via attached displacement encoder, via integrated displacement encoder	via proximity sensor	via proximity sensor, via inductive sensors
<b>Description</b>	<ul style="list-style-type: none"> <li>Minimal space required</li> <li>High precision and load capacity</li> <li>Recirculating ball bearing guide or heavy-duty guide</li> <li>Wide range of variants</li> </ul>	<ul style="list-style-type: none"> <li>Magnetic force transmission</li> <li>Pressure-tight and zero leakage</li> <li>Dirt-proof and dust-proof</li> </ul>	<ul style="list-style-type: none"> <li>Recirculating ball bearing guiderecirculating ball bearing guide</li> <li>Magnetic force transmission</li> <li>Individual choice of end-position cushioning and sensing</li> </ul>
<b>online:</b> →	<a href="#">dgp</a>	<a href="#">dgo</a>	<a href="#">slm</a>





## Software tool

<p><b>Mass moment of inertia</b></p> 	<p>Juggling pencils and pocket calculators is now a thing of the past. No matter whether you have discs, blocks, push-on flanges, grippers, etc., this tool does the job of calculating all the mass moments of inertia. Just save, send or print and you're finished.</p>	<p>This tool can be found</p> <ul style="list-style-type: none"> <li>either in the electronic catalogue by clicking on the blue button "Engineering"</li> <li>or on the DVD under Engineering Tools.</li> </ul>
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## Semi-rotary drives

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Type	 Quarter turn actuatorquarter turn actuator DSM, DSM-B, DSM-HD-B	 Quarter turn actuatorquarter turn actuator DSR, DSRL	 Quarter turn actuatorquarter turn actuator DRRD	 Quarter turn actuatorquarter turn actuator DRQ
Size	6, 8, 10, 12, 16, 25, 32, 40, 63	10, 12, 16, 25, 32, 40	8, 10, 12, 16, 20, 25, 32, 35, 40, 50, 63	16, 20, 25, 32, 40, 50, 63, 80, 100
Torque at 6 bar	0.15 ... 80 Nm	0.5 ... 20 Nm	0.2 ... 112 Nm	0.5 ... 150 Nm
Swivel angle	0 ... 270°	0 ... 180°	180°	90 ... 360°
Permissible mass moment of inertia	6.5 ... 5000 kgcm <sup>2</sup>	0 .. 150 kgcm <sup>2</sup>	0.0015 ... 42 kgm <sup>2</sup>	2 ... 2000 kgcm <sup>2</sup>
Position sensing	via proximity sensor, without	without	via proximity sensor	via proximity sensor
Description	<ul style="list-style-type: none"> <li>Force transmitted directly to the drive shaft via a rotary vane</li> <li>With spigot shaft, hollow flanged shaft, tandem rotary vane and spigot shaft, tandem rotary vane and flanged shaft or heavy-duty bearing (HD)</li> </ul>	<ul style="list-style-type: none"> <li>Force transmitted directly to the drive shaft via a rotary vane</li> <li>With spigot or hollow flanged shaft</li> </ul>	<ul style="list-style-type: none"> <li>With twin pistons based on the rack and pinion principle</li> <li>Very high accuracy in the end positions</li> <li>Very high load bearing capacity</li> <li>Very good axial run-out at the flanged shaft</li> </ul>	<ul style="list-style-type: none"> <li>Conversion of linear motion into rotary motion via a backlash-compensating gear unit</li> <li>High precision thanks to backlash-free transmission of force from the gear rack to the pinion</li> </ul>
online: →	<a href="#">dsm</a>	<a href="#">dsr</a>	<a href="#">drdd</a>	<a href="#">drq</a>

## Semi-rotary drives


Type	 Quarter turn actuatorquarter turn actuator DRQD, DRQD-B	 Swivel/linear drive unit DSL-B
Size	6, 8, 12, 16, 20, 25, 32, 40, 50	16, 20, 25, 32, 40
Torque at 6 bar	0.16 ... 78.6 Nm	1.25 ... 20 Nm
Swivel angle	0 ... 360°	0 ... 272°
Permissible mass moment of inertia	0.075 ... 11000 kgcm <sup>2</sup>	0.35... 40 kgcm <sup>2</sup>
Position sensing	via proximity sensor	via proximity sensor
Description	<ul style="list-style-type: none"> <li>With twin pistons based on the rack and pinion principle</li> <li>High accuracy</li> <li>Extremely good rigidity</li> <li>Wide range of variants</li> <li>With spigot or flanged shaft</li> </ul>	<ul style="list-style-type: none"> <li>Rotation and linear motion can be controlled individually or simultaneously</li> <li>High repetition accuracy</li> <li>With plain or recirculating ball bearing guide</li> <li>Through piston rod</li> </ul>
online: →	<a href="#">drqd</a>	<a href="#">dsl</a>

## Tandem and high-force cylinders

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Type	<b>High-force cylinder ADNH</b>	<b>Tandem cylinder DNCT</b>
Piston diameter	25mm, 40mm, 63mm, 100mm	32mm, 40mm, 50mm, 63mm, 80mm, 100mm, 125mm
Theoretical force at 6 bar, advancing	1036 ... 18281 N	898 ... 14244 N
Stroke	1 ... 150 mm	2 ... 500 mm
Description	<ul style="list-style-type: none"> <li>• Mounting hole pattern to ISO 21287</li> <li>• Max. 4 cylinders can be combined</li> <li>• Increased thrust force</li> <li>• Only 2 connections are required to pressurise all cylinders</li> <li>• For position sensing</li> <li>• Piston rod with male or female thread</li> </ul>	<ul style="list-style-type: none"> <li>• Mounting hole pattern to ISO 15552</li> <li>• Max. 2 cylinders can be combined</li> <li>• Thrust and return force increase</li> <li>• For position sensing</li> <li>• Piston rod with male thread</li> </ul>
online: →	<a href="#">adnh</a>	<a href="#">dnct</a>

## Multi-position cylinder



	
Type	<b>Multi-position cylinders ADNM</b>
Piston diameter	25mm, 40mm, 63mm, 100mm
Theoretical force at 6 bar, advancing	295 ... 4712 N
Max. total of all individual strokes	1000 ... 2000 mm
Description	<ul style="list-style-type: none"> <li>• Mounting hole pattern to ISO 21287</li> <li>• Piston rod with male or female thread</li> <li>• 2 ... 5 cylinders can be combined</li> <li>• Max. 5 positions can be approached</li> <li>• Piston rod with male or female thread</li> <li>• For position sensing</li> </ul>
online: →	<a href="#">adnm</a>

## Drives with slides

1





Type	 Mini slide DGSC	 Mini slide DGSL	 Mini slide SLF	 Mini slide SLS
<b>Piston diameter</b>	6mm	6mm, 8mm, 10mm, 12mm, 16mm, 20mm, 25mm, 32mm	6mm, 10mm, 16mm	6mm, 10mm, 16mm
<b>Theoretical force at 6 bar, advancing</b>	17N	17 ... 483 N	17 ... 121 N	17 ... 121 N
<b>Stroke</b>	10mm	10 ... 200 mm	10 ... 80 mm	5 ... 30 mm
<b>Cushioning</b>	P: elastic cushioning rings/pads at both ends	E: short elastic cushioning rings/pads at both ends, P1: elastic cushioning rings/pads at both ends with fixed stop, P: elastic cushioning rings/pads at both ends, Y3: progressive shock absorber at both ends	P: elastic cushioning rings/pads at both ends	P: elastic cushioning rings/pads at both ends
<b>Position sensing</b>	without	via proximity sensor	via proximity sensor	via proximity sensor
<b>Description</b>	<ul style="list-style-type: none"> <li>• Smallest guided slide unit on the market</li> <li>• Precision ball bearing cage guide: for a safe and high-quality process in the application</li> <li>• Long service life thanks to housing made from high-alloy steel</li> <li>• Low break-away pressure and uniform movement thanks to minimal friction from guide and seal</li> </ul>	<ul style="list-style-type: none"> <li>• High load capacity and positioning accuracy</li> <li>• Maximum movement precision thanks to ground-in ball bearing cage guide</li> <li>• Maximum flexibility thanks to 8 sizes</li> <li>• Reliable in the event of a pressure drop thanks to clamping cartridge or end-position locking</li> <li>• Versatile mounting options thanks to piggy-back</li> <li>• Compact</li> </ul>	<ul style="list-style-type: none"> <li>• Flat design</li> <li>• Ball bearing guide</li> <li>• Versatile mounting options</li> <li>• Easy adjustment of end positions</li> </ul>	<ul style="list-style-type: none"> <li>• Slim design</li> <li>• Ball bearing guide</li> <li>• Versatile mounting options</li> </ul>
<b>online:</b> →	<a href="#">dgsc</a>	<a href="#">dgsl</a>	<a href="#">slf</a>	<a href="#">sls</a>

## Drives with slides

Type	 Mini slide SLT	 Slide unit SPZ
<b>Piston diameter</b>	6mm, 10mm, 16mm, 20mm, 25mm	10mm, 16mm, 20mm, 25mm, 32mm
<b>Theoretical force at 6 bar, advancing</b>	34 ... 590 N	60 ... 724 N
<b>Stroke</b>	10 ... 200 mm	10 ... 100 mm
<b>Cushioning</b>	CC: shock absorber at both ends, P: elastic cushioning rings/pads at both ends	P: elastic cushioning rings/pads at both ends
<b>Position sensing</b>	via proximity sensor	via proximity sensor
<b>Description</b>	<ul style="list-style-type: none"> <li>• Powerful twin piston drive</li> <li>• Ball bearing guide</li> <li>• Versatile mounting options</li> <li>• Easy adjustment of end positions</li> </ul>	<ul style="list-style-type: none"> <li>• Twin piston</li> <li>• High force with excellent protection against torsion</li> <li>• Widely spaced piston rods for high load capacity</li> <li>• Plain or recirculating ball bearing guide</li> </ul>
<b>online:</b> →	<a href="#">slt</a>	<a href="#">spz</a>





## Drives with guide rods

1


Type	 Guided drive DGRF	 Guided drive DFP	 Compact cylinder ADNGF	 Compact cylinder ADVUL
<b>Piston diameter</b>	20mm, 25mm, 32mm, 40mm, 50mm, 63mm	10mm, 16mm, 25mm, 32mm, 50mm, 80mm	12mm, 16mm, 20mm, 25mm, 32mm, 40mm, 50mm, 63mm, 80mm, 100mm	12mm, 16mm, 20mm, 25mm, 32mm, 40mm, 50mm, 63mm, 80mm, 100mm
<b>Theoretical force at 6 bar, advancing</b>	189 ... 1870 N	31 ... 3016 N	68 ... 4712 N	51 ... 4712 N
<b>Stroke</b>	10 ... 400 mm	25 ... 500 mm	1 ... 400 mm	1 ... 400 mm
<b>Cushioning</b>	PPS: self-adjusting pneumatic end-position cushioning, P: elastic cushioning rings/pads at both ends, PPV: pneumatic cushioning, adjustable at both ends	P: elastic cushioning rings/pads at both ends, PPV: pneumatic cushioning, adjustable at both ends	P: elastic cushioning rings/pads at both ends, PPS: self-adjusting pneumatic end-position cushioning	P: elastic cushioning rings/pads at both ends
<b>Position sensing</b>	via proximity sensor	via proximity sensor	via proximity sensor	via proximity sensor
<b>Description</b>	<ul style="list-style-type: none"> <li>Designed completely to "Clean Design" criteria</li> <li>Long service life thanks to optional seal for unlubricated operation</li> <li>FDA-approved lubrication and sealing on the basic version</li> <li>Good corrosion resistance and smooth surfaces for easy cleaning</li> <li>Hygienic mounting of the sensors possible</li> <li>Compact design with high guide precision and load capacity</li> </ul>	<ul style="list-style-type: none"> <li>High-precision guiding thanks to recirculating ball bearing guide on piston rod</li> <li>Able to absorb high torques</li> <li>Saves space in comparison with standard cylinders</li> </ul>	<ul style="list-style-type: none"> <li>Mounting hole pattern to ISO 21287</li> <li>Piston rod secured against rotation by means of guide rod and yoke plate</li> <li>Plain-bearing guide</li> <li>Available with through piston rod</li> </ul>	<ul style="list-style-type: none"> <li>Piston rod secured against rotation by means of guide rod and yoke plate</li> <li>For position sensing</li> <li>Plain-bearing guide</li> <li>Available with through piston rod</li> </ul>
<b>online:</b> →	<a href="#">dgrf</a>	<a href="#">dfp</a>	<a href="#">adngf</a>	<a href="#">advul</a>

## Drives with guide rods

1


				
Type	<b>Mini guided drive DFC</b>	<b>Guided drive DFM, DFM-B</b>	<b>Twin-piston cylinder DPZ</b>	<b>Twin-piston cylinder DPZJ</b>
<b>Piston diameter</b>	4mm, 6mm, 10mm	12mm, 16mm, 20mm, 25mm, 32mm, 40mm, 50mm, 63mm, 80mm, 100mm	10mm, 16mm, 20mm, 25mm, 32mm	10mm, 16mm, 20mm, 25mm, 32mm
<b>Theoretical force at 6 bar, advancing</b>	7.5 ... 47 N	51 ... 4712 N	94 ... 966 N	60 ... 724 N
<b>Stroke</b>	5 ... 30 mm	10 ... 400 mm	10 ... 100 mm	10 ... 100 mm
<b>Cushioning</b>	P: elastic cushioning rings/pads at both ends	P: elastic cushioning rings/pads at both ends, PPV: pneumatic cushioning, adjustable at both ends, YSRW: shock absorber, soft characteristic curve	P: elastic cushioning rings/pads at both ends	P: elastic cushioning rings/pads at both ends
<b>Position sensing</b>	via proximity sensor, without	via proximity sensor	via proximity sensor	via proximity sensor
<b>Description</b>	<ul style="list-style-type: none"> <li>• Smallest guided drive</li> <li>• High precision and load capacity</li> <li>• Minimal space requirement</li> <li>• Drive and guide unit in a single housing</li> <li>• Plain or recirculating ball bearing guides</li> </ul>	<ul style="list-style-type: none"> <li>• Drive and guide unit in a single housing</li> <li>• Plain or recirculating ball bearing guides</li> <li>• High resistance to torques and lateral forces</li> <li>• Wide range of mounting options</li> <li>• Wide range of variants</li> </ul>	<ul style="list-style-type: none"> <li>• Twin pistons provide twice the force in half the space</li> <li>• Plain or recirculating ball bearing guides</li> <li>• Precision stroke adjustment in the end position</li> </ul>	<ul style="list-style-type: none"> <li>• With yoke plate on rear of cylinder for higher lateral forces and precision</li> <li>• Twin pistons provide twice the force in half the space</li> <li>• Plain or recirculating ball bearing guides</li> <li>• Precision stroke adjustment in the end position</li> </ul>
<b>online:</b> →	<a href="#">dfc</a>	<a href="#">dfm</a>	<a href="#">dpz</a>	<a href="#">dpzj</a>

## Drives with guide rods




	
Type	<b>Linear drive unit SLE</b>
<b>Piston diameter</b>	10mm, 16mm, 20mm, 25mm, 32mm, 40mm, 50mm
<b>Theoretical force at 6 bar, advancing</b>	47 ... 1178 N
<b>Stroke</b>	10 ... 500 mm
<b>Cushioning</b>	YSR: shock absorber, hard characteristic curve
<b>Position sensing</b>	via proximity sensor, via inductive sensors
<b>Description</b>	<ul style="list-style-type: none"> <li>• Combination of guide unit and standard cylinder</li> <li>• Multi-axis and drive combinations</li> <li>• Recirculating ball bearing guiderecirculating ball bearing guide</li> </ul>
<b>online:</b> →	<a href="#">sle</a>

## Linear modules

1


	
Type	Linear module HMP-B
Mode of operation	Double-acting
Piston diameter	16mm, 20mm, 25mm, 32mm
Stroke	50 ... 400 mm
Theoretical force at 6 bar, advancing	121 ... 483 N
Position sensing	via proximity sensor
Description	<ul style="list-style-type: none"> <li>• Precision and backlash-free guidance</li> <li>• High rigidity with a long stroke</li> <li>• Infinitely adjustable end stops</li> <li>• Flexible thanks to intermediate position</li> <li>• Adjustable end-position cushioning</li> </ul>
online: →	<a href="#">hmp</a>

## Stopper cylinder


			
Type	Stopper cylinders DFSP	Stopper cylinders DFST	Stopper cylinders STAF
Piston diameter	16 mm, 20 mm, 32 mm, 50mm	50mm, 63mm, 80mm	32mm, 80mm
Permissible impact force on the advanced piston rod	710 ... 6280 N	3000 ... 6000 N	480 ... 14600 N
Stroke	5 ... 30 mm	30 ... 40 mm	20 mm, 30 mm, 40 mm
Position sensing	via proximity sensor	via proximity sensor	via proximity sensor
Toggle lever position sensing		via inductive sensors	
Description	<ul style="list-style-type: none"> <li>• Trunnion version with/without female thread, with/without protection against rotation</li> <li>• Roller version with protection against rotation</li> <li>• Compact design</li> <li>• Sensor slots on 3 sides</li> <li>• Long service life owing to very good cushioning characteristics and sturdy piston rod guide</li> <li>• Workpiece carriers, pallets and packages weighing up to 90 kg can be safely stopped</li> </ul>	<ul style="list-style-type: none"> <li>• Toggle lever design</li> <li>• Integrated adjustable shock absorber for smooth and adapted stopping</li> <li>• Up to 800 kg impact load</li> <li>• For position sensing on the piston</li> <li>• For position sensing on the toggle lever by inductive sensor</li> <li>• Lever locking mechanism</li> <li>• Toggle lever deactivator</li> </ul>	<ul style="list-style-type: none"> <li>• Roller version, toggle lever design</li> <li>• Absorption of high lateral forces</li> <li>• Direct mounting of solenoid valves on flange plate</li> </ul>
online: →	<a href="#">dfsp</a>	<a href="#">dfst</a>	<a href="#">sta</a>

## Clamping cylinder

1



Type	 <p><b>Clamping module</b> EV</p>
Clamping area	10x30, 15x40, 15x63, 20x120, 20x180, 20x75, Ø 12, Ø 16, Ø 20, Ø 25, Ø 32, Ø 40, Ø 50, Ø 63
Stroke	3 ... 5 mm
Description	<ul style="list-style-type: none"> <li>• Single-acting, with reset function</li> <li>• Clamping force 55 ... 1690 N</li> <li>• Compact cylinders without piston rod, with diaphragm</li> <li>• Flat, space-saving design</li> <li>• Hermetically sealed</li> <li>• Pressure plates and foot mounting as accessories</li> </ul>
online: →	<a href="#">ev</a>

## Linear/swivel clamp


Type	 <p><b>Linear/swivel clamps</b> CLR</p>
Piston diameter	12mm, 16mm, 20mm, 25mm, 32mm, 40mm, 50mm, 63mm
Theoretical clamping force at 6 bar	51 ... 1682 N
Clamping stroke	10 ... 50 mm
Swivel angle	90°+/- 2°, 90°+/- 3°, 90°+/- 4°
Description	<ul style="list-style-type: none"> <li>• Double-acting</li> <li>• Swivelling and clamping in one step</li> <li>• Swivel direction adjustable</li> <li>• Compact</li> <li>• Clamping fingers as accessories</li> <li>• Available with dust and welding spatter protection</li> <li>• For position sensing</li> </ul>
online: →	<a href="#">clr</a>

## Hinge cylinder

1



		
Type	Hinge cylinders DFAW	Hinge cylinders DW, DWA, DWB, DWC
Piston diameter	50mm, 63mm, 80mm	50mm, 63mm, 80mm
Stroke	10 ... 200 mm	10 ... 200 mm
Theoretical force at 6 bar, advancing	1178 ... 3016 N	1178 ... 3016 N
Position sensing	via proximity sensor	via proximity sensor, without
Cushioning	PPS: pneumatic cushioning, self-adjusting at both ends	PPV: pneumatic cushioning, adjustable at both ends
Description	<ul style="list-style-type: none"> <li>• Hinge cylinder for clamping components during the welding process</li> <li>• Easy assembly thanks to swivel bearing on the bearing cap</li> <li>• Integrated flow control</li> <li>• Integrated, self-adjusting end-position cushioning</li> </ul>	<ul style="list-style-type: none"> <li>• Hinge cylinder for clamping components during the welding process</li> <li>• Easy assembly thanks to swivel bearing on the bearing cap</li> <li>• Integrated flow control</li> <li>• Integrated end-position cushioning</li> </ul>
online: →	<a href="#">dfaw</a>	<a href="#">dw</a>

## Bellows actuators

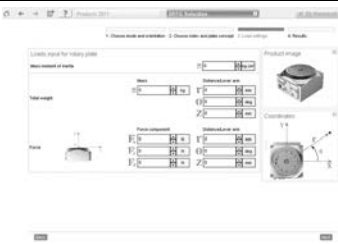
	
Type	Bellows actuator EB
Size	80, 145, 165, 215, 250, 325, 385
Stroke	20 ... 230 mm
Description	<ul style="list-style-type: none"> <li>• Use as a spring element or for reducing oscillations</li> <li>• Single-bellows or double-bellows cylinder</li> <li>• High forces with a short stroke</li> <li>• Uniform movement: no stick-slip effect</li> <li>• Use in dusty environments or in water</li> <li>• Maintenance-free</li> </ul>
online: →	<a href="#">eb</a>




## Fluidic muscle

Type	 <p><b>Fluidic muscles</b> <b>DMSP</b></p>	 <p><b>Fluidic muscles</b> <b>MAS</b></p>
Size	10, 20, 40	10, 20, 40
Theoretical force at 6 bar	480 ... 6000 N	480 ... 6000 N
Nominal length	40 ... 9000 mm	40 ... 9000 mm
Max. contraction	25% of nominal length	25% of nominal length
Description	<ul style="list-style-type: none"> <li>• With press-fitted connection</li> <li>• Up to 30% less weight: a superb force/weight ratio</li> <li>• Single-acting, pulling</li> <li>• 3 integrated adapter variants</li> <li>• 10 times the initial force of a comparable pneumatic cylinder</li> <li>• Stick-slip-free movements</li> <li>• Hermetically sealed design offers protection against dust, dirt and moisture</li> </ul>	<ul style="list-style-type: none"> <li>• With screwed connection</li> <li>• Optional with force retention</li> <li>• Single-acting, pulling</li> <li>• Use of customer-specific adaptation options</li> <li>• 10 times the initial force of a comparable pneumatic cylinder</li> <li>• Stick-slip-free movements</li> <li>• Hermetically sealed design offers protection against dust, dirt and moisture</li> </ul>
online: →	<a href="#">dmsp</a>	<a href="#">mas</a>

## Software tool

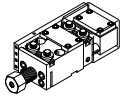
<p><b>Rotary indexing table</b></p>		<p>This tool helps you to select the right rotary indexing table of the type DHTG from Festo for your application. Let yourself be guided by the program and enter your general parameters and you will receive at least one suggestion for the product best suited to your application.</p>	<p>This tool can be found</p> <ul style="list-style-type: none"> <li>• either in the electronic catalogue by clicking on the blue button "Engineering"</li> <li>• or on the DVD under Engineering Tools.</li> </ul>
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## Rotary indexing tables



Type	 <p><b>Rotary indexing table</b> <b>DHTG</b></p>
Size	65, 90, 140, 220
Torque at 6 bar	2.1 ... 58.9 Nm
Pitch	2 ... 24
Description	<ul style="list-style-type: none"> <li>• Sturdy mechanical system</li> <li>• Simple planning and commissioning</li> <li>• Rotary table diameters: 65, 90, 140, 220 mm</li> <li>• Various directions of rotation possible</li> </ul>
online: →	<a href="#">dhtg</a>

## Pneumatic feed units



1

	
Type	Pneumatic feed unit BV
Size	50 mm, 100 mm, 200 mm
Working stroke	0 ... 350 mm
Theoretical force at 6 bar, advancing	240 ... 800 N
Theoretical force at 6 bar, retracting	180 ... 640 N
Assembly position	Any
Description	<ul style="list-style-type: none"> <li>• Compact units for stepped feeding of belts, strips, rods, profiles and tubes</li> <li>• Infinitely adjustable feed speed, feed length, clamping and feed force</li> </ul>
online: →	<a href="#">bv</a>


## Linear actuators for process automation

		
Type	Linear drive with displacement encoder DFPI	Linear drive Copac DLP
Piston diameter	100mm, 125mm, 160mm, 200mm, 250mm, 320mm	80mm, 100 mm, 125mm, 160mm, 200mm, 250mm, 320mm
Stroke	40 ... 990 mm	40 ... 600 mm
Theoretical force at 6 bar, advancing	4712 ... 48255 N	3016 ... 48255 N
Position sensing	via integrated displacement encoder	via proximity sensor
Description	<ul style="list-style-type: none"> <li>• Closed-loop controlled actuator for all linear process valves</li> <li>• With optional integrated positioner and valve block</li> <li>• Position feedback via analogue 4...20 mA signal for simple diagnostics</li> <li>• Easy to integrate into existing control architecture</li> <li>• Sturdy and compact housing for use outdoors</li> <li>• Connection for process valves to DIN 3358</li> </ul>	<ul style="list-style-type: none"> <li>• Integrated air supply</li> <li>• Port pattern to Namur for solenoid valves to VDI/VDE 3845</li> <li>• Connection for process valves to DIN 3358</li> </ul>
online: →	<a href="#">dfpi</a>	<a href="#">dlp</a>

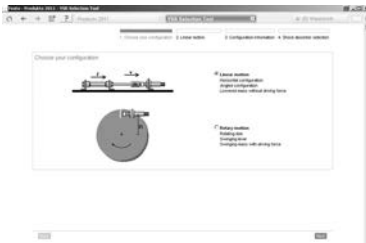
## Quarter turn actuators for process automation

<b>Type</b>	 <p>Quarter turn actuator DAPS</p>	 <p>Quarter turn actuator DFPB</p>
<b>Design</b>	Scotch yoke system	
<b>Mode of operation</b>	Double-acting, single-acting	
<b>Size of valve actuator</b>	0008, 0015, 0030, 0053, 0060, 0090, 0106, 0120, 0180, 0240, 0360, 0480, 0720, 0960, 1440, 1920, 2880, 3840, 4000, 5760, 8000	10, 15, 20, 30, 40, 45, 60, 65, 80, 110, 120, 150, 170, 180, 230, 270, 300, 330, 370, 420, 470, 520, 550, 670, 840, 1050
<b>Flange hole pattern</b>	F03, F04, F05, F07, F10, F12, F14, F16, F25	
<b>Operating pressure</b>	1 ... 8.4 bar	
<b>Ambient temperature</b>	-50 ... +80 °C	
<b>Description</b>	<ul style="list-style-type: none"> <li>• High breakaway torques</li> <li>• Approved in accordance with Directive 94/9/EC (ATEX)</li> <li>• Flange hole pattern to ISO 5211</li> <li>• Mounting hole pattern to VDI/VDE 3845</li> <li>• Available with handwheel as a manual emergency override</li> <li>• Corrosion-resistant stainless steel variant</li> </ul>	
<b>online: →</b>	<a href="#">daps</a>	<a href="#">dfpb</a>

## Cylinder/valve combinations





<b>Type</b>	 <p>Standard cylinder DNC-V</p>
<b>Mode of operation</b>	Double-acting
<b>Piston diameter</b>	32mm, 40mm, 50mm, 63mm, 80mm, 100mm
<b>Theoretical force at 6 bar, advancing</b>	415 ... 4712 N
<b>Stroke</b>	100... 2000 mm
<b>Cushioning</b>	P: elastic cushioning rings/pads at both ends, PPV: pneumatic cushioning, adjustable at both ends
<b>Description</b>	<ul style="list-style-type: none"> <li>• Standard hole pattern</li> <li>• Assembled and fitted with tubing, ready for installation</li> <li>• Particularly suitable for decentralised use in larger systems</li> <li>• Valve versions: single or double solenoid valves, mounted on the right or left</li> <li>• For position sensing</li> <li>• Wide range of variants</li> </ul>
<b>online: →</b>	<a href="#">dnc-v</a>

## Software tool





<b>Shock absorber selection</b> 	Whether diagonal or vertical, curved or straight, lever or disc, all types of cushioned movements are taken into account. The software tool always recommends the best shock absorber.	This tool can be found <ul style="list-style-type: none"> <li>• either in the electronic catalogue by clicking on the blue button "Engineering"</li> <li>• or on the DVD under Engineering Tools.</li> </ul>
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## Shock absorber



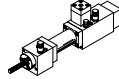
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Type	 Shock absorbers DYSR	 Shock absorbers YSR-C	 Shock absorbers YSRW	 Shock absorbers YSRW-DGC
Stroke	8 ... 60 mm	4 ... 60 mm	8 ... 34 mm	for Ø 8 ... 63
Max. energy absorption per stroke	4 ... 384 J	0.6 ... 380 J	1.3 ... 70 J	
Cushioning	Adjustable	Self-adjusting	Self-adjusting, soft characteristic curve	Self-adjusting, soft characteristic curve
Description	<ul style="list-style-type: none"> <li>Hydraulic shock absorber with spring return</li> <li>Adjustable cushioning hardness</li> </ul>	<ul style="list-style-type: none"> <li>Hydraulic shock absorber with path-controlled flow control function</li> <li>Rapidly increasing cushioning force curve</li> <li>Short cushioning stroke</li> <li>Suitable for rotary drives</li> </ul>	<ul style="list-style-type: none"> <li>Hydraulic shock absorber with path-controlled flow control function</li> <li>Gently increasing cushioning force curve</li> <li>Long cushioning stroke</li> <li>Suitable for low-vibration operation</li> <li>Short cycle times possible</li> </ul>	<ul style="list-style-type: none"> <li>For linear drives DGC</li> <li>Sizes 12, 18, 25, 32, 40, 50, 63</li> </ul>
online: →	<a href="#">dysr</a>	<a href="#">ysr-c</a>	<a href="#">ysrw</a>	<a href="#">ysrw-dgc</a>





## Shock absorber

Type	 Shock absorbers YSRWJ	 Shock absorbers DYEF-Y1, DYEF-Y1F	 Shock absorbers DYSC	 Shock absorbers DYSW
Stroke	8 ... 14 mm	0.9 ... 7 mm	4 ... 18 mm	6 ... 20 mm
Max. energy absorption per stroke	1 ... 3 J	0.005 ... 1.2 J	0.6 ... 25 J	0.8 ... 12 J
Cushioning	Self-adjusting, soft characteristic curve	P cushioning with metal fixed stop, P cushioning without metal fixed stop	Self-adjusting	Self-adjusting, soft characteristic curve
Description	<ul style="list-style-type: none"> <li>Cushioning with self-adjusting, progressive hydraulic shock absorber</li> <li>Gently increasing cushioning force curve</li> <li>Adjustable cushioning stroke</li> <li>End-position sensing with proximity sensor SME/SMT-8</li> <li>Precision end-position adjustment</li> </ul>	<ul style="list-style-type: none"> <li>Mechanical shock absorber with flexible rubber buffer</li> <li>Elastic rubber buffer allows a defined metal end position</li> <li>Adjustable cushioning hardness</li> <li>Ideal for cushioning low energy</li> <li>With precise metal end position</li> </ul>	<ul style="list-style-type: none"> <li>Hydraulic shock absorber with path-controlled flow control function</li> <li>Rapidly increasing cushioning force curve</li> <li>Short cushioning stroke</li> <li>Suitable for rotary drives</li> <li>With metal fixed stop</li> </ul>	<ul style="list-style-type: none"> <li>Hydraulic shock absorber with path-controlled flow control function</li> <li>Gently increasing cushioning force curve</li> <li>Long cushioning stroke</li> <li>Suitable for low-vibration operation</li> <li>Short cycle times possible</li> <li>With metal fixed stop</li> </ul>
online: →	<a href="#">ysrwj</a>	<a href="#">dyef</a>	<a href="#">dysc</a>	<a href="#">dysw</a>

## Shock absorber



Type	 Hydraulic cushioning cylinder <b>DYHR</b>	 Hydraulic cushioning cylinder <b>YD</b>	 Hydraulic cushioning cylinder <b>YZL</b>
<b>Stroke</b>	20 ... 60 mm	70 ... 250 mm	80 ... 250 mm
<b>Max. energy absorption per stroke</b>	32 ... 384 J	80 N when flow control valve is open ... 4000 N	220 N retracting, 150 N advancing ... 4000 N
<b>Cushioning</b>	Adjustable	Adjustable	Adjustable
<b>Description</b>	<ul style="list-style-type: none"> <li>Hydraulic cushioning cylinder for constant, slow braking speeds across the entire stroke</li> <li>Braking speed can be precisely adjusted</li> <li>A built-in compression spring returns the piston rod to the initial position</li> <li>Suitable for slow feed speeds in the range up to 0.1 m/s</li> </ul>	<ul style="list-style-type: none"> <li>With speed control in one direction (retracting piston rod) and rapid traverse (advancing piston rod)</li> <li>Infinitely adjustable, slow constant speeds</li> </ul>	<ul style="list-style-type: none"> <li>With speed regulation in both directions and pneumatic actuator for intermediate rapid traverse during advancing and retracting</li> <li>Infinitely adjustable, slow constant speeds</li> </ul>
<b>online:</b> →	<a href="#">dyhr</a>	<a href="#">yd</a>	<a href="#">yzl</a>

## Accessories for pneumatic drives

Type	 Guide unit <b>FEN, FENG</b>	 Guide axis <b>DGC-FA</b>	 Guide axis <b>FDG</b>	 Clamping cartridge <b>KP</b>
<b>Size</b>	8, 12, 20, 25, 32, 40, 50, 63, 80, 100	8, 12, 18, 25, 32, 40, 50, 63	18, 25, 32, 40, 50, 63	
<b>Stroke</b>	1 ... 500 mm	1 ... 8500 mm	1 ... 5100 mm	
<b>Round material to be clamped</b>				4 ... 32 mm
<b>Static holding force</b>				80 ... 7500 N
<b>Description</b>	<ul style="list-style-type: none"> <li>For protecting standard cylinders against rotation at high torques</li> <li>High guide precision for workpiece handling</li> <li>Plain or recirculating ball bearing guides</li> </ul>	<ul style="list-style-type: none"> <li>Without drive</li> <li>With protected recirculating ball bearing guide</li> <li>With guide and freely movable slide unit</li> <li>Various cushioning options</li> <li>For supporting force and torque capacity in multi-axis applications</li> <li>Increased torsional resistance</li> <li>Reduced vibrations with dynamic loads</li> <li>Available with additional slide</li> </ul>	<ul style="list-style-type: none"> <li>Without drive</li> <li>With recirculating ball bearing guide</li> <li>With guide and freely movable slide unit</li> <li>For supporting force and torque capacity in multi-axis applications</li> <li>Increased torsional resistance</li> <li>Reduced vibrations with dynamic loads</li> </ul>	<ul style="list-style-type: none"> <li>For in-house assembly of clamping units</li> <li>Not certified for use in safety-relevant control systems</li> </ul>
<b>online:</b> →	<a href="#">fen</a>	<a href="#">dgc-fa</a>	<a href="#">fdg</a>	<a href="#">kp</a>

## Accessories for pneumatic drives

1

Type	 Clamping unit KPE, KEC, KEC-S	 Clamping unit, clamping component DADL
Size		16, 20, 25, 32, 35, 40, 50, 63
Stroke		
Round material to be clamped	4 ... 32 mm	
Static holding force	80 ... 8000 N	
Description	<ul style="list-style-type: none"> <li>• KPE: ready-to-install combination of clamping cartridge KP and housing</li> <li>• KEC: for use as a holding device (static application)</li> <li>• KEC-S: for safety-related applications</li> </ul>	<ul style="list-style-type: none"> <li>• Clamping unit DADL-EL: for quarter turn actuator DRRD, for mechanical lock in the end positions to prevent unwanted movement in unpressurised condition</li> <li>• Clamping component DADL-EC: for quarter turn actuator DRRD, for securing an intermediate position in combination with the clamping unit DADL-EL</li> </ul>
online: →	<a href="#">kpe</a>	<a href="#">dadl</a>

## Customised components – for your specific requirements

**Drives with customised designs**

Can't find the pneumatic drive you need in our catalogue?

We can offer you customised components that are tailored to your specific requirements – from minor product modifications to complete new product developments.

Common product modifications:


- Materials for special ambient conditions
- Customised dimensions
- Special strokes
- Customised mounting options
- Implementation of special cylinder functions (cylinder/valve combinations, single-acting principle, etc.)

Many additional variants are possible. Ask your Festo sales engineer, who will be happy to help.

Further information on customised components can be found on your local website at [www.festo.com](http://www.festo.com)

## Software tool

**Soft Stop**







Soft Stop virtually makes the impossible possible. Travel times are reduced by as much as 30% for pneumatic drives and vibration is also greatly reduced. The selection program performs all of the necessary calculations.

This tool can be found

- either in the electronic catalogue by clicking on the blue button "Engineering"
- or on the DVD under Engineering Tools.


2

## Linear drives with displacement encoder


Type	 Linear drive, with integrated displacement encoder <b>DDLI</b>	 Standard cylinder, integrated displacement encoder <b>DDPC</b>	 Standard cylinder with displacement encoder <b>DNCI</b>	 Linear drive with displacement encoder <b>DGCI</b>
<b>Piston diameter</b>	25mm, 32mm, 40mm, 63mm	100mm, 80mm	32mm, 40mm, 50mm, 63mm	18mm, 25mm, 32mm, 40mm, 63mm
<b>Theoretical force at 6 bar, advancing</b>	295 ... 1870 N	3016 ... 4712 N	415 ... 1870 N	153 ... 1870 N
<b>Max. load, horizontal</b>	30 ... 180 kg	300 ... 450 kg	45 ... 180 kg	1 ... 180 kg
<b>Max. load, vertical</b>	10 ... 60 kg	100 ... 150 kg	15 ... 60 kg	1... 60 kg
<b>Stroke</b>	100 ... 2000 mm	10 ... 2000 mm	10 ... 2000 mm	100 ... 2000 mm
<b>Description</b>	<ul style="list-style-type: none"> <li>• Without guide</li> <li>• With contactless measuring displacement encoder</li> <li>• Based on linear drive DGC-K</li> <li>• Supply ports on end face</li> <li>• Can be used as a measuring cylinder</li> <li>• Suitable for positioning with axis controller CPX-CMAX</li> <li>• Suitable for end-position control with end-position controller CPX-CMPX, SPC11</li> </ul>	<ul style="list-style-type: none"> <li>• Standards-based cylinder to ISO 15552</li> <li>• With contactless measuring displacement encoder</li> <li>• Can be used as a measuring cylinder</li> <li>• Suitable for positioning with axis controller CPX-CMAX</li> <li>• Suitable for end-position control with end-position controller CPX-CMPX, SPC11</li> <li>• Piston rod variants</li> <li>• Fixed cushioning</li> </ul>	<ul style="list-style-type: none"> <li>• Standards-based cylinder to ISO 15552</li> <li>• With integrated displacement encoder for relative analogue, contactless measuring</li> <li>• Suitable for servopneumatic applications with axis controller CPX-CMAX, end-position controller CPX-CMPX, SPC11 and measuring module CPX-CMIX</li> <li>• Piston rod variants</li> <li>• Piston rod with male thread</li> </ul>	<ul style="list-style-type: none"> <li>• With displacement encoder for absolute and contactless measuring</li> <li>• Suitable for servopneumatic applications with axis controller CPX-CMAX, end-position controller CPX-CMPX, SPC11 and measuring module CPX-CMIX</li> <li>• With guide</li> <li>• Supply ports alternatively on end face or front</li> </ul>
<b>online:</b> →	<a href="#">ddli</a>	<a href="#">ddpc</a>	<a href="#">dncl</a>	<a href="#">dgci</a>

## Linear drives with displacement encoder

2





	
<b>Type</b>	<b>Linear drive with displacement encoder</b> <b>DGPI, DGPIL</b>
<b>Piston diameter</b>	25 mm, 32 mm, 40 mm, 50 mm, 63 mm
<b>Theoretical force at 6 bar, advancing</b>	295 ... 1870 N
<b>Max. load, horizontal</b>	2 ... 180 kg
<b>Max. load, vertical</b>	10... 60 kg
<b>Stroke</b>	225 ... 2000 mm
<b>Description</b>	<ul style="list-style-type: none"> <li>• With integrated displacement encoder for absolute and contactless measuring</li> <li>• Suitable for servopneumatic applications with axis controller CPX-CMAX, end-position controller CPX-CMPX, SPC11 and measuring module CPX-CMIX</li> <li>• Available with or without guide</li> </ul>
<b>online: →</b>	<a href="#">dgpil</a>

## Semi-rotary drives with displacement encoder


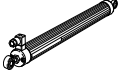

	
<b>Type</b>	<b>Swivel module with angular displacement encoder</b> <b>DSMI-B</b>
<b>Piston diameter</b>	25mm, 40mm, 63mm
<b>Torque at 6 bar</b>	5 ... 40 Nm
<b>Max. mass moment of inertia, horizontal</b>	0.03 ... 0.6 kgm <sup>2</sup>
<b>Max. mass moment of inertia, vertical</b>	0.03 ... 0.6 kgm <sup>2</sup>
<b>Swivel angle</b>	0 ... 272°
<b>Description</b>	<ul style="list-style-type: none"> <li>• Integrated rotary encoder</li> <li>• Suitable for servopneumatic applications with CPX-CMAX, -CMPX, -CMIX and SPC11</li> <li>• With rotary vane</li> <li>• Compact design</li> </ul>
<b>online: →</b>	<a href="#">dsmi</a>





## Axis controllers

Type	 <b>Axis controller</b> CPX-CMAX	 <b>End-position controller</b> CPX-CMPX	 <b>End-position controller</b> SPC11	 <b>Measuring module</b> CPX-CMIX
<b>No. of axis strings</b>	1	1	1	1
<b>Axes per string</b>	1	1	1	1
<b>Description</b>	<ul style="list-style-type: none"> <li>Axis controller as CPX module, supports pneumatic drives with piston rod, rodless drives and semi-rotary drives</li> <li>Force and position control</li> <li>Use with all fieldbus/Ethernet and CEC controllers available in CPX</li> <li>Easy commissioning thanks to auto identification function</li> <li>Rapid commissioning and comprehensive diagnostics with the parameterisation software FCT</li> </ul>	<ul style="list-style-type: none"> <li>Electronic end-position control for pneumatic drives</li> <li>Soft Stop for smooth braking and quick acceleration</li> <li>Use with all fieldbus/Ethernet available in CPX</li> <li>Easy commissioning, Festo plug and work</li> <li>Approx. 30% shorter travel times and 30% less air consumption than with comparable standard pneumatics</li> </ul>	<ul style="list-style-type: none"> <li>Quickly and smoothly into the end position with two additional intermediate positions</li> <li>Electronic end-position cushioning</li> <li>Quick and easy commissioning: configure, teach, done</li> <li>Supports pneumatic drives with piston rod, rodless drives and semi-rotary drives</li> </ul>	<ul style="list-style-type: none"> <li>Pneumatics and electrics – movement and measurement on one platform</li> <li>Innovative measurement technology – piston rod drives, rodless drives, rotary drives</li> <li>Actuation via fieldbus</li> <li>Remote maintenance, remote diagnostics, web server, SMS and e-mail alert are all possible via TCP/IP</li> <li>Modules can be quickly exchanged and expanded without altering the wiring</li> </ul>
<b>online: →</b>	<a href="#">cpx-cmax</a>	<a href="#">cpx-cmpx</a>	<a href="#">spc11</a>	<a href="#">cpx-cmix</a>



## Displacement encoders

Type	 <b>Displacement encoder</b> MLO-POT-TLF	 <b>Displacement encoder</b> MLO-POT-LWG	 <b>Displacement encoder</b> MME-MTS-TLF
<b>Stroke</b>	225 ... 2000 mm	100 ... 750 mm	225 ... 2000 mm
<b>Measuring principle of displacement encoder</b>	Analogue	Analogue	digital
<b>Output signal</b>	Analogue	Analogue	CAN protocol type SPC-AIF
<b>Displacement resolution</b>	0.01mm	0.01mm	0 ... 0.01 mm
<b>Description</b>	<ul style="list-style-type: none"> <li>Conductive plastic potentiometer</li> <li>Absolute measurement with high resolution</li> <li>High travel speeds and long service life</li> <li>Several mounting options on pneumatic linear drives DGPL</li> <li>Plug-in connections</li> </ul>	<ul style="list-style-type: none"> <li>Connecting rod potentiometer</li> <li>Absolute measurement with high resolution</li> <li>Long service life</li> <li>High protection class</li> <li>Plug-in connections</li> </ul>	<ul style="list-style-type: none"> <li>Measuring principle: magnetostrictive</li> <li>Contactless with absolute measurements</li> <li>High travel speeds</li> <li>System product for servopneumatic positioning technology and Soft Stop</li> </ul>
<b>online: →</b>	<a href="#">mlo</a>	<a href="#">mlo</a>	<a href="#">mme</a>


## Proportional valves

		
<b>Type</b>	<b>Proportional directional control valve VPWP</b>	<b>Proportional directional control valve MPYE</b>
<b>Valve function</b>	5/3-way proportional directional control valve, closed	5/3-way, closed
<b>Pneumatic connection 1</b>	G1/8, G1/4, G3/8	G1/8, G1/4, G3/8, M5
<b>Operating pressure</b>	0 ... 10 bar	0 ... 10 bar
<b>Nominal flow rate</b>	350 ... 2000 l/min	100 ... 2000 l/min
<b>Description</b>	<ul style="list-style-type: none"> <li>Controlled piston spool valve</li> <li>Digital actuation</li> <li>Integrated pressure sensors for monitoring function and force control</li> <li>With auto identification</li> <li>Diagnostic function</li> <li>Integrated digital output, e.g. for a clamping/brake unit</li> <li>Suitable for servopneumatic applications with CPX-CMAX and CPX-CMPX</li> </ul>	<ul style="list-style-type: none"> <li>Controlled piston spool valve</li> <li>Analogue actuation</li> <li>Setpoint input as analogue voltage signal (0 ... 10 V)</li> <li>Suitable for servopneumatic applications with SPC11</li> </ul>
<b>online:</b> →	<a href="#">vpwp</a>	<a href="#">mpye</a>

## Sensor interfaces





		
<b>Type</b>	<b>Sensor interface CASM</b>	<b>Measured-value transducer DADE</b>
<b>Diagnostic function</b>	Display via LED	Display via LED
<b>Electrical connection, displacement encoder</b>	5-pin, 8-pin, socket,, M12	8-pin, socket,, M12
<b>Electrical connection, control interface</b>	5-pin, M9, plug connector	
<b>Control interface</b>	CAN Bus with Festo protocol, digital, without terminating resistor	
<b>Description</b>	<ul style="list-style-type: none"> <li>For actuating pneumatic positioning drives with the latest servopneumatic systems such as CPX-CMAX, -CMPX and -CMIX</li> <li>Short cables for analogue signals, secure digitised bus transmission</li> <li>Convenient plug and work concept with auto identification and comprehensive diagnostics</li> <li>High protection class IP67</li> </ul>	<ul style="list-style-type: none"> <li>For standard cylinder DNC1, DDP1</li> <li>Converts sensor signals into voltage or current signals</li> <li>Mounting via through-holes</li> <li>Diagnostic display via LED</li> </ul>
<b>online:</b> →	<a href="#">casm</a>	<a href="#">dade</a>

## Software tool





<p><b>PositioningDrives</b></p> 	<p>Which electromechanical linear drive best meets your needs? Enter the data for your application, such as position values, effective loads and mounting position, and the software suggests a number of solutions.</p>	<p>This tool can be found</p> <ul style="list-style-type: none"> <li>• either in the electronic catalogue by clicking on the blue button "Engineering"</li> <li>• or on the DVD under Engineering Tools.</li> </ul>
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## Linear drives and slide units

Type	 Electric cylinder EPCO	 Electric cylinder ESBF	 Electric cylinder DNCE	 Spindle axis EGC-BS-KF
<b>Size</b>	16, 25, 40	63, 80, 100	32, 40, 63	50, 70, 80, 120, 185
<b>Max. feed force Fx</b>	50 ... 650 N	6000 ... 17000 N	300 ... 2500 N	300 ... 3000 N
<b>Repetition accuracy</b>	+/-0.02 mm	+/-0.01 mm, +/-0.015 mm	+/-0.02 ... +/-0.03 mm, +/-0.02 mm, +/-0.07 mm	+/-0.02 mm
<b>Working stroke</b>	50 ... 400 mm	1 ... 1500 mm	100 ... 800 mm	50 ... 3000 mm
<b>Description</b>	<ul style="list-style-type: none"> <li>• Linear drive with permanently mounted motor</li> <li>• With ball screw</li> <li>• Available with female thread</li> <li>• Available with holding brake</li> <li>• Protection class IP40</li> <li>• Compact dimensions</li> <li>• Extensive mounting accessories for various installation situations</li> <li>• Suitable for simple applications in factory automation that in the past were mostly carried out using pneumatic solutions</li> </ul>	<ul style="list-style-type: none"> <li>• With spindle drive</li> <li>• Optional: high corrosion protection, protection class IP65, suitable for the food industry, piston rod extension</li> <li>• Wide range of accessories</li> </ul>	<ul style="list-style-type: none"> <li>• Lead screw or ball screw</li> <li>• Standard hole pattern to ISO 15552</li> <li>• Available with high corrosion protection</li> <li>• Available with lubrication approved for food use</li> <li>• Axial or parallel motor mounting</li> <li>• Integrated reference switch</li> <li>• Freely positionable</li> <li>• Non-rotating piston rod</li> <li>• Larger strokes available on request</li> </ul>	<ul style="list-style-type: none"> <li>• Recirculating ball bearing guide for high loads and torques</li> <li>• Available with clamping unit, one or both ends</li> <li>• Profile with optimised rigidity</li> <li>• High dynamic response and minimum vibration</li> <li>• Various spindle pitches</li> <li>• Reference switch optional</li> <li>• Freely positionable</li> </ul>
<b>online:</b> →	<a href="#">epco</a>	<a href="#">esbf</a>	<a href="#">dnce</a>	<a href="#">egc-bs</a>





## Linear drives and slide units

Type	 Spindle axis EGC-HD-BS	 Toothed belt axis EGC-TB-KF	 Toothed belt axis EGC-HD-TB	 Mini slide EGSL
Size	125, 160, 220	50, 70, 80, 120, 185	125, 160, 220	35, 45, 55, 75
Max. feed force F <sub>x</sub>	300 ... 1300 N	50 ... 2500 N	450 ... 1800 N	75 ... 450 N
Repetition accuracy	+/-0.02 mm	+/-0.08 mm, +/-0.1 mm	+/-0.08 mm, +/-0.1 mm	+/-0.015 mm
Working stroke	50 ... 2400 mm	50 ... 8500 mm	50 ... 5000 mm	50 ... 300 mm
Description	<ul style="list-style-type: none"> <li>• With heavy-duty guide</li> <li>• With integrated ball screw</li> <li>• For maximum loads and torques, high feed forces and speeds and long service life</li> <li>• Precise and resilient DUO guide</li> <li>• Excellent price/performance ratio</li> <li>• Flexible motor connection</li> </ul>	<ul style="list-style-type: none"> <li>• Recirculating ball bearing guide for high loads and torques</li> <li>• Available with clamping unit, one or both ends</li> <li>• Profile with optimised rigidity</li> <li>• High dynamic response and minimum vibration</li> <li>• Small toothed disc diameter</li> <li>• Reference switch optional</li> <li>• Freely positionable</li> </ul>	<ul style="list-style-type: none"> <li>• With heavy-duty guide</li> <li>• For maximum loads and torques, high feed forces and speeds and long service life</li> <li>• Precise and resilient DUO guide</li> <li>• Excellent price/performance ratio</li> <li>• Flexible motor connection</li> </ul>	<ul style="list-style-type: none"> <li>• Very high rated slide loads, ideal for vertical applications such as press-fitting or joining</li> <li>• Reliable: the completely closed spindle stops dirt or stray small parts getting into the guide area</li> <li>• Flexible: motor can be attached laterally or axially, in this case turned by 4 x 90°</li> <li>• Suitable software tools in the software package FCT from Festo</li> </ul>
online: →	<a href="#">egc-hd-bs</a>	<a href="#">egc-tb</a>	<a href="#">egc-hd-tb</a>	<a href="#">egsl</a>

## Linear drives and slide units





Type	 Mini slide SLTE	 Electric slide EGSK	 Electric slide EGSP	 Toothed belt axis ELGA-TB-G
Size	10, 16	15, 20, 26, 33, 46	20, 26, 33, 46	70, 80, 120
Max. feed force F <sub>x</sub>		19 ... 392 N	69 ... 466 N	350 ... 1300 N
Repetition accuracy	+/-0.1 mm	+/-0.003 ... +/-0.004 mm, +/-0.003 ... +/-0.01 mm, +/-0.01 mm	+/-0.003 ... +/-0.01 mm	+/-0.08 mm
Working stroke	50 ... 150 mm	25 ... 840 mm	25 ... 840 mm	50 ... 8500 mm
Description	<ul style="list-style-type: none"> <li>• Electromechanical linear axis with lead screw spindle</li> <li>• With DC servo motor</li> <li>• Easy actuation via I/O interface, PROFIBUS, CANopen, DeviceNet</li> <li>• Precise and rigid guide</li> <li>• Freely positionable</li> <li>• Fast positioning times</li> </ul>	<ul style="list-style-type: none"> <li>• Electromechanical linear axis with recirculating ball bearing spindle</li> <li>• Recirculating ball bearing guide and ball screw without caged ball bearings</li> <li>• Standardised mounting interfaces</li> <li>• Compact design</li> <li>• High rigidity</li> <li>• Long service life</li> </ul>	<ul style="list-style-type: none"> <li>• Electromechanical linear axis with recirculating ball bearing spindle</li> <li>• Ball bearing guide with caged ball bearings</li> <li>• Size 33, 46 features a ball screw with caged ball bearings</li> <li>• Low maintenance</li> <li>• Uniform operating behaviour with very low noise levels</li> <li>• Standardised mounting interfaces</li> <li>• Compact design</li> <li>• High rigidity</li> <li>• Long service life</li> </ul>	<ul style="list-style-type: none"> <li>• Integrated plain-bearing guide</li> <li>• For small and medium loads</li> <li>• Minimal guide backlash</li> <li>• As an actuator for external guides</li> <li>• Speeds up to 5 m/s with high acceleration up to 50 m/s<sup>2</sup></li> <li>• Flexible motor connection</li> </ul>
online: →	<a href="#">slte</a>	<a href="#">egsk</a>	<a href="#">egsp</a>	<a href="#">elga</a>

### Linear drives and slide units


Type	 <b>Toothed belt axis ELGA-TB-RF</b>	 <b>Toothed belt axis ELGG</b>	 <b>Toothed belt axis ELGR</b>	 <b>Cantilever axis DGEA-ZR</b>
<b>Size</b>	70, 80, 120	35, 45, 55	35, 45, 55	18, 25, 40
<b>Max. feed force Fx</b>	350 ... 1300 N	50 ... 350 N	50 ... 350 N	230 ... 1000 N
<b>Repetition accuracy</b>	+/-0.08 mm	+/-0.1 mm	+/-0.1 mm	+/-0.05 mm
<b>Working stroke</b>	50 ... 7400 mm	50 ... 1200 mm	50 ... 1500 mm	1 ... 1000 mm
<b>Description</b>	<ul style="list-style-type: none"> <li>• Integrated roller bearing guide</li> <li>• High speeds up to 10 m/s with high acceleration up to 50 m/s<sup>2</sup></li> <li>• Guide backlash = 0 mm</li> <li>• Very good operating performance under torque load</li> <li>• Sturdy alternative for the recirculating ball bearing guide</li> <li>• As an actuator for external guides, especially for high speeds</li> </ul>	<ul style="list-style-type: none"> <li>• For universal use with opposing movement</li> <li>• The different guide variants, the optional long slide and the central support enable solutions that are technically appropriate, reliable and at the same time economical</li> <li>• Long service life of over 2500 km per slide</li> <li>• Easy and reliable configuration with PositioningDrives</li> <li>• Fast and convenient commissioning with the Festo Configuration Tool FCT</li> </ul>	<ul style="list-style-type: none"> <li>• Optimum price/performance ratio</li> <li>• Ready-to-install unit for quick and easy design</li> <li>• High reliability thanks to tested service life of 5000 km</li> <li>• Motor can be mounted on any one of 4 sides</li> <li>• With plain or recirculating ball bearing guide</li> <li>• Kit for easy and space-saving end-position sensing</li> <li>• Quick commissioning following simple configuration using the PositioningDrives software as well as predefined parameter sets in the parameterisation software FCT</li> </ul>	<ul style="list-style-type: none"> <li>• Toothed belt drive with recirculating ball bearing guide</li> <li>• Dynamic cantilever operation</li> <li>• Stationary drive head</li> <li>• Reference switch optional</li> <li>• Freely positionable</li> </ul>
<b>online:</b> →	<a href="#">elga</a>	<a href="#">elgg</a>	<a href="#">elgr</a>	<a href="#">dgea</a>

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### Linear drives and slide units

Type	 <b>Toothed belt axis DGE-ZR, DGE-ZR-KF, DGE-ZR-HD</b>	 <b>Linear drive DGE-ZR-RF</b>	 <b>Spindle axis DGE-SP</b>	 <b>Positioning axis DMES</b>
<b>Size</b>	8, 12, 18, 25, 40, 63	25, 40, 63	18, 25, 40, 63	18, 25, 40, 63
<b>Max. feed force Fx</b>	15 ... 1500 N	260... 1500 N	140 ... 1600 N	240 ... 3000 N
<b>Repetition accuracy</b>	+/-0.08 mm, +/-0.1 mm	+/-0.1 mm	+/-0.02 mm	+/-0.05 mm, +/-0.07 mm
<b>Working stroke</b>	1 ... 4500 mm	1 ... 5000 mm	100 ... 2000 mm	50 ... 1800 mm
<b>Description</b>	<ul style="list-style-type: none"> <li>• Electromechanical axis with toothed belt DGE-ZR: without guide; DGE-ZR-KF: with recirculating ball bearing guide; DGE-ZR-HD: with heavy-duty guide, recirculating ball bearing guide</li> <li>• Highly adaptable thanks to wide choice of mounting and attachment options</li> <li>• Wide range of options for mounting on drives</li> <li>• Comprehensive range of mounting accessories for multi-axis combinations</li> <li>• Optional protected version</li> </ul>	<ul style="list-style-type: none"> <li>• Electromechanical axis with toothed belt and internal roller bearing guide</li> <li>• High speeds possible</li> <li>• Highly adaptable thanks to wide choice of mounting and attachment options</li> <li>• Wide range of options for mounting on drives</li> <li>• Comprehensive range of mounting accessories for multi-axis combinations</li> </ul>	<ul style="list-style-type: none"> <li>• Without guide, recirculating ball bearing guide or heavy-duty guide</li> <li>• Optional protected version</li> <li>• Compact dimensions</li> <li>• Reference switch optional</li> <li>• Freely positionable</li> </ul>	<ul style="list-style-type: none"> <li>• Mechanical linear drive</li> <li>• Without guide, plain guide or recirculating ball bearing guide</li> <li>• High mechanical torques</li> <li>• High feed forces of up to 3000 N</li> <li>• Compact dimensions</li> <li>• Reference switch optional</li> <li>• Freely positionable</li> </ul>
<b>online:</b> →	<a href="#">dge-zr</a>	<a href="#">dge-zr</a>	<a href="#">dge-sp</a>	<a href="#">dmes</a>

## Semi-rotary drives





	
Type	<b>Rotary module</b> <b>ERMB</b>
Size	20, 25, 32
Max. driving torque	0.7 ... 8.5 Nm
Max. input speed	900 ... 1350 rpm
Rotation angle	Infinite
Description	<ul style="list-style-type: none"> <li>• Electromechanical rotary module with toothed belt</li> <li>• Compact design</li> <li>• Mounting interfaces on all sides</li> <li>• Stable arrangement of the output shaft bearings</li> <li>• Unlimited and flexible rotation angle</li> </ul>
online: →	<a href="#">ermb</a>

## Electric handling modules





	
Type	<b>Rotary/lifting module</b> <b>EHMB</b>
Size	20, 25, 32
Max. driving torque	0.7 ... 6.7 Nm
Max. input speed	900 ... 1350 rpm
Rotation angle	Infinite
Description	<ul style="list-style-type: none"> <li>• Complete module with combined and configurable rotary/lifting movement</li> <li>• Dynamic, flexible, economical thanks to the modular drive concept for the linear movement</li> <li>• Hollow axis with large internal diameter makes laying power supply lines easy, convenient and safe</li> <li>• Extremely short positioning times thanks to high dynamic response during rotation: e.g. 0.25 s when swivelling a 1 kg load by 180°</li> </ul>
online: →	<a href="#">ehmb</a>

Direct drives

3

Type	 <b>Short-stroke cylinder ADNE-LAS</b>	 <b>Guided drive DFME-LAS</b>	 <b>Electric cylinder DNCE-LAS</b>	 <b>Linear drive ELGL-LAS</b>
<b>Size</b>	32, 40	32, 40	32, 40	30, 64, 120
<b>Max. feed force Fx</b>	8 ... 55 N	94 ... 202 N	93.7 ... 202 N	56 ... 475 N
<b>Repetition accuracy</b>	+/-0.01 mm	+/-0.015 mm	+/-0.02 ... +/-0.03 mm, +/-0.02 mm, +/-0.07 mm	+/-0.01 mm
<b>Working stroke</b>	15 ... 45 mm	100 ... 400 mm	100 ... 400 mm	1 ... 5750 mm
<b>Description</b>	<ul style="list-style-type: none"> <li>• Electric short-stroke cylinder with integrated linear motor</li> <li>• Highly dynamic movement between two end positions</li> <li>• Electronic end-position cushioning</li> <li>• Easy commissioning, Festo plug and work</li> <li>• Also for harsh ambient conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Recirculating ball bearing guiderecirculating ball bearing guide</li> <li>• Consisting of freely positionable linear motor, integrated displacement encoder and reference switch</li> <li>• Positioning with very high dynamic response for small loads</li> <li>• Long service life and maintenance-free operation</li> <li>• Easy actuation via I/O interface, PROFIBUS, CANopen including interpolated position mode, DeviceNet</li> <li>• Configuration and commissioning with the parameterisation software FCT</li> <li>• Festo plug and work for smooth logistics and assembly</li> </ul>	<ul style="list-style-type: none"> <li>• Linear motor axis with piston rod</li> <li>• Consisting of freely positionable linear motor, integrated displacement encoder, reference switch and plain bearings</li> <li>• Positioning with very high dynamic response for small loads</li> <li>• Easy actuation via I/O interface, PROFIBUS, CANopen including interpolated position mode, DeviceNet</li> <li>• Festo plug and work for clear logistics and rapid assembly</li> <li>• Configuration and commissioning with the parameterisation software FCT</li> </ul>	<ul style="list-style-type: none"> <li>• Electric linear drive with linear motor, air cushion bearing and displacement encoder</li> <li>• Ready-to-install system offering greater flexibility, precision and dynamic response</li> <li>• Air cushion bearing provides high precision, high linearity and wear-free characteristics</li> <li>• Actuation via motor controller CMMP-AS</li> </ul>
<b>online:</b> →	<a href="#">adne</a>	<a href="#">dfme</a>	<a href="#">dnce</a>	<a href="#">elgl</a>

Linear guides

Type	 <b>Guide unit EAGF</b>	 <b>Guide axis ELFR</b>	 <b>Guide axis EGC-FA</b>	 <b>Guide axis FDG-ZR-RF</b>
<b>Size</b>	63, 80, 100	35, 45, 55	70, 80, 120, 185	25, 40, 63
<b>Stroke</b>	1 ... 500 mm	50 ... 1500 mm	50 ... 8500 mm	1... 5000 mm
<b>Guide</b>	Recirculating ball bearing guiderecirculating ball bearing guide	Plain-bearing guide, Recirculating ball bearing guiderecirculating ball bearing guide	Recirculating ball bearing guiderecirculating ball bearing guide	Internal roller guide
<b>Description</b>	<ul style="list-style-type: none"> <li>• For protecting electric cylinder ESBF against rotation at high torque</li> <li>• High guide precision</li> </ul>	<ul style="list-style-type: none"> <li>• Driveless guide unit with guide and freely movable slide</li> <li>• For supporting force and torque capacity in multi-axis applications</li> <li>• Increased torsional resistance</li> <li>• Reduced vibrations with dynamic loads</li> </ul>	<ul style="list-style-type: none"> <li>• Driveless guide unit with guide and freely movable slide</li> <li>• For supporting force and torque capacity in multi-axis applications</li> <li>• Increased torsional resistance</li> <li>• Reduced vibrations with dynamic loads</li> </ul>	<ul style="list-style-type: none"> <li>• Driveless linear guide unit with guide and freely movable slide unit</li> <li>• For supporting force and torque capacity in multi-axis applications</li> <li>• Increased torsional resistance</li> <li>• Reduced vibrations with dynamic loads</li> </ul>
<b>online:</b> →	<a href="#">eagf</a>	<a href="#">elfr</a>	<a href="#">egc</a>	<a href="#">fdg</a>

## Customised components – for your specific requirements



### Drives with customised designs

Can't find the electromechanical drive you need in our catalogue?

We can offer you customised components that are tailored to your specific requirements – from minor product modifications to complete new product developments.

Common product modifications:

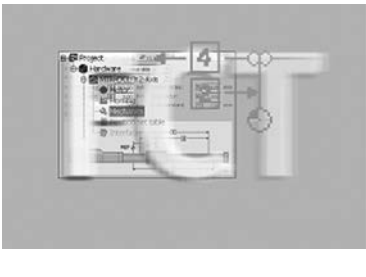
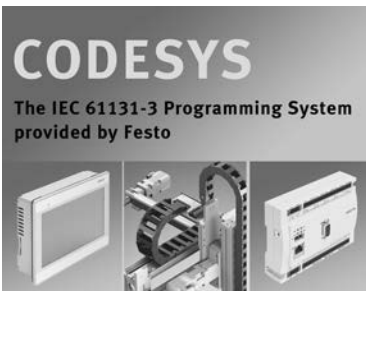
- Special strokes
- Design for special ambient conditions
- Design optimised for the fitting space
- Design with opposing carriages
- Design with absolute encoder

Many additional variants are possible. Ask your Festo sales engineer, who will be happy to help.




Further information on customised components can be found on your local website at [www.festo.com](http://www.festo.com)





## Software tool

<b>Festo Configuration Tool (FCT)</b>		<p>FCT is a configuration and parameterisation software program that supports all Festo devices, in particular motor controllers.</p> <p>It is extremely flexible, provides full support for the device properties and is simple and intuitive to operate. The user is guided step-by-step through the commissioning process while each individual step is checked.</p>	<p>The parameterisation software can be found on the website under Support &gt; Support Portal &gt; enter search term.</p>
<b>CODESYS</b>		<p>CODESYS for standardised programming of embedded devices to IEC 61131-3. It makes your life easier with simple commissioning, fast programming and parameterisation.</p> <p>Advantages</p> <ul style="list-style-type: none"> <li>• Hardware-neutral software platform for quick and easy configuration, programming and commissioning of pneumatic and electrical automation solutions</li> <li>• Extensive module libraries for single or multi-axis positioning motions</li> </ul>	<ul style="list-style-type: none"> <li>• The IEC 61131-3 standard means that CODESYS is flexible and open for all types of control tasks</li> <li>• Modular: offline and online functions, as well as components for hardware configuration and visualisation</li> <li>• Convenient IEC function block extension</li> <li>• Re-use of existing application parts</li> </ul> <p>The parameterisation software can be found on the website under Support &gt; Support Portal &gt; enter search term.</p>




## Servo motors

Type	 <b>Servo motor</b> <b>EMME-AS</b>	 <b>Servo motor</b> <b>EMMS-AS</b>	 <b>Motor unit</b> <b>MTR-DCI</b>
<b>Nominal torque</b>	0.12 ... 6.4 Nm	0.14 ... 22.63 Nm	
<b>Nominal rotational speed</b>	3000 ... 9000 rpm	2000 ... 10300 rpm	3000 ... 3400 rpm
<b>Peak torque</b>	0.7 ... 30 Nm	0.5 ... 120 Nm	
<b>Maximum speed</b>	3910 ... 10000 rpm	2210 ... 23040 rpm	3000 ... 3400 rpm
<b>Description</b>	<ul style="list-style-type: none"> <li>• Brushless, permanently excited synchronous servo motor</li> <li>• Reliable, dynamic, precise</li> <li>• Selectable feedback systems: digital absolute displacement encoder, single turn or multi-turn</li> <li>• Optimised connection technology</li> </ul>	<ul style="list-style-type: none"> <li>• Permanently excited, electrodynamic, brushless servo motor</li> <li>• Digital absolute displacement encoder, single turn or multi-turn</li> <li>• Available with holding brake</li> <li>• Optimised connection technology</li> </ul>	<ul style="list-style-type: none"> <li>• DC motor with encoder</li> <li>• Gear unit, controller, integrated power electronics</li> <li>• Parameterisation interface RS232</li> <li>• I/O, PROFIBUS, CANopen, PROFIBUS DP, DeviceNet interface</li> <li>• Control panel with display, optional</li> <li>• Gear ratio: 7:1, 14:1, 22:1</li> </ul>
<b>online:</b> →	<a href="#">emme</a>	<a href="#">emms-as</a>	<a href="#">mtr-dci</a>




## Stepper motors

		
Type	Stepper motor EMMS-ST	Stepper motor MTRE-ST
Maximum speed	430 ... 2720 rpm	
Motor holding torque	0.5 ... 9.3 Nm	0.34Nm
Description	<ul style="list-style-type: none"> <li>• 2-phase hybrid technology</li> <li>• Stepper angle 1.8°</li> <li>• Standard industrial connection technology</li> <li>• Optional: encoder, brake</li> </ul>	<ul style="list-style-type: none"> <li>• With integrated controller</li> <li>• Optional: brake</li> <li>• Step-accurate positioning through specification of the number of control pulses</li> <li>• Step angle (full step) 1.8°</li> </ul>
online: →	<a href="#">emms-st</a>	<a href="#">mtre</a>




## Controllers for AC servo motors

			
Type	Motor controller CMMD-AS	Motor controller CMMS-AS	Motor controller CMMP-AS-M0, CMMP-AS-M3
Nominal current	8 ... 10 A	4 ... 5 A	2 ... 20 A
Nominal operating voltage AC	230V	230V	230 ... 400 V
Nominal operating voltage phases	1-phase	1-phase	1-phase, 3-phase
Rated output of controller	1200VA	600VA	500 ... 12000 VA
Fieldbus coupling	CANopen, DeviceNet, PROFIBUS DP	CANopen, DeviceNet, PROFIBUS DP	CANopen, DeviceNet, EtherNet, EtherNet/IP, PROFIBUS DP, PROFINET, SERCOS
Description	<ul style="list-style-type: none"> <li>• Only one piece of controller hardware required to move two servo motors independently of each other</li> <li>• The motor current of 2x 4 A can be distributed between both controllers with a ratio of 2 A: 6 A</li> <li>• Easy and convenient: commissioning and firmware updates via SD card slot</li> <li>• Programming and parameterisation via software tools</li> <li>• Jerk-free and infinite positioning by means of closed-loop operation</li> <li>• Reliable restart blocking for safety-relevant applications</li> </ul>	<ul style="list-style-type: none"> <li>• Digital absolute encoder in single-turn and multi-turn versions</li> <li>• Can be operated as a torque, speed or position controller</li> <li>• Position controller, integrated brake chopper</li> <li>• I/O interface</li> <li>• Electronic gear unit</li> </ul>	<ul style="list-style-type: none"> <li>• Flying saw</li> <li>• For cam disk controllers and highly dynamic movements</li> <li>• Standardised interfaces allow seamless integration in mechatronic multi-axis modular systems</li> <li>• Reliable and convenient commissioning, programming and parameterisation via software tools</li> <li>• Optionally with 3 slots for switch or safety module, for extension module</li> </ul>
online: →	<a href="#">cmmd-as</a>	<a href="#">cmms-as</a>	<a href="#">cmmp-as</a>





## Controllers for DC servo motors

Type	 Motor controller SFC-LACI	 Motor controller SFC-DC	 End-position controller CMFL
Nominal current, load supply	10A	3A	3A
Nominal voltage, load supply DC	48V	24V	24 V selectable, 48 V
Rated output of controller	480VA	75VA	
Fieldbus coupling	CANopen, PROFIBUS DP	CANopen, DeviceNet, PROFIBUS DP	
Description	<ul style="list-style-type: none"> <li>• High degree of protection IP54</li> <li>• Open-loop and closed-loop position controller</li> <li>• Easy actuation via I/O interface, PROFIBUS, CANopen including interpolated position mode</li> <li>• With or without control panel</li> <li>• Parameterisation via control panel or parameterisation software FCT</li> <li>• For controlling electric cylinder DNCE-LAS and guided drive DFME-LAS</li> </ul>	<ul style="list-style-type: none"> <li>• High degree of protection IP54</li> <li>• Easy actuation via I/O interface, PROFIBUS, CANopen, DeviceNet</li> <li>• With or without control panel</li> <li>• Parameterisation via control panel or parameterisation software FCT</li> <li>• For actuating mini slide SLTE, parallel gripper HGPLE</li> </ul>	<ul style="list-style-type: none"> <li>• For force-controlled positioning of short-stroke cylinder ADNE-LAS</li> <li>• Realisation of dynamic movement with continuous monitoring, including "Motion Complete"</li> <li>• High dynamic response</li> </ul>
online: →	<a href="#">sfc-laci</a>	<a href="#">sfc-dc</a>	<a href="#">cmfl</a>



## Controllers for stepper motors

Type	 Motor controller CMMO-ST	 Motor controller CMMS-ST	 Motor controller SEC-ST
Nominal current	5 A		1.25 ... 6 A
Nominal current, load supply	6 A	80	
Max. step frequency		4kHz	40kHz
Controller operating mode	Cascade controller with PI speed controller, PI current controller, P position controller, PWM MOSFET power end stage	PWM MOSFET power end stage	Bipolar chopper driver
Fieldbus coupling		CANopen, PROFIBUS DP	
Description	<ul style="list-style-type: none"> <li>• As open-loop and closed-loop position controller</li> <li>• Separate load and logic supply</li> <li>• Supports the "Safe Torque Off" (STO) safety function</li> <li>• Easy actuation via I/O interface</li> <li>• Monitoring of freely definable position zones</li> <li>• Backup file enables seamless device replacement</li> </ul>	<ul style="list-style-type: none"> <li>• Can be operated as a torque, speed or position controller</li> <li>• Position controller, integrated brake chopper</li> <li>• I/O interface</li> <li>• Electronic gear unit</li> </ul>	<ul style="list-style-type: none"> <li>• Compact unit, ready for installation</li> <li>• Current reduction</li> <li>• Pre-assembled, electrical connection accessories</li> </ul>
online: →	<a href="#">cmmo-st</a>	<a href="#">cmms-st</a>	<a href="#">sec-st</a>


## Multi-axis controllers

Type	 Control block CPX-CMXX	 Control block CPX-CEC-M1	 Controller CECX-X-M1	 Controller CECX-X-C1
Operating voltage		21.6 ... 26.4 V DC	19.2 ... 30 V DC	19.2 ... 30 V DC
Operating voltage range DC	18 ... 30 V			
Control interface	CAN	CAN	CAN	CAN
Fieldbus coupling		CODESYS Level 2, EasyIP, Modbus TCP, TCP/IP	TCP/IP, EasyIP, Modbus TCP	TCP/IP, EasyIP, Modbus TCP
Supported kinematic systems	2-axis gantries X-Z/Y-Z/X-Y, 3-axis gantries X-Y-Z			
Description	<ul style="list-style-type: none"> <li>Intelligent module in the CPX terminal for actuating electric drive units</li> <li>Coordination of the entire motion sequence</li> <li>Actuation of 2 axis groups with max. 4 axes per group</li> <li>Ethernet and CAN Bus interface</li> </ul>	<ul style="list-style-type: none"> <li>Programming with CODESYS to IEC 61131-3</li> <li>Easy actuation of valve terminal configurations</li> <li>Connection to all fieldbuses as a remote controller and for pre-processing</li> <li>Diagnostics with flexible monitoring options for pressure, flow rate, cylinder operating time, air consumption</li> <li>Actuation of electric drives as individual axes via CANopen</li> <li>SoftMotion functions for coordinated multi-axis movements</li> </ul>	<ul style="list-style-type: none"> <li>Motion controller with CODESYS and SoftMotion</li> <li>Programming to standard IEC 61131-3</li> <li>Three plug-in slots for optional modules</li> <li>Optional: communication module for PROFIBUS</li> </ul>	<ul style="list-style-type: none"> <li>Modular master controller with CODESYS</li> <li>Programming to standard IEC 61131-3</li> <li>Three plug-in slots for optional modules</li> <li>Optional: communication module for PROFIBUS</li> </ul>
online: →	<a href="#">cmxx</a>	<a href="#">cpx-cec-m1</a>	<a href="#">cecx</a>	<a href="#">cecx</a>

## Multi-axis controllers


Type	 Controller CMXR-C1	 Controller CMXR-C2
Operating voltage	24 VDC +20% / -15%, 24 VDC +25% / -20%	24 VDC +20% / -15%, 24 VDC +25% / -20%
Operating voltage range DC		
Control interface		
Fieldbus coupling	2 x CANopen masters	2 x CANopen masters
Supported kinematic systems	2-axis gantries X-Z/Y-Z/X-Y, 3-axis gantries X-Y-Z, Any interpolation, parallel kinematic system	2-axis gantries X-Z/Y-Z/X-Y, 3-axis gantries X-Y-Z, Any interpolation, parallel kinematic system
Description	<ul style="list-style-type: none"> <li>Multi-axis control for linear and three-dimensional gantries, parallel kinematic systems</li> <li>Optional teach pendant CDSA</li> <li>Point-to-point and complex path control</li> <li>Ethernet and CAN Bus interface</li> </ul>	<ul style="list-style-type: none"> <li>Individual integration in higher-order controllers or simple integration of peripheral devices, e.g. tracking function via vision systems with integrated CODESYS PLC</li> <li>Ideal for bonding or sealing applications: greater process reliability and quality with defined, speed-independent switching points on the path</li> <li>Increased flexibility: modular control system for digital and analogue I/O optionally expandable</li> </ul>
online: →	<a href="#">cmxr-c1</a>	<a href="#">cmxr-c2</a>

## Positioners for process automation



Type	 <p><b>Positioner</b> <b>CMSX</b></p>
Nominal flow rate	50 l/min
Ambient temperature	-5 ... +60 °C
Reference value	0 ... 10 V, 0 ... 20 mA, 4 ... 20 mA
Operating pressure	3 ... 8 bar
Safety note	Adjustable, retaining, closing, opening
Description	<ul style="list-style-type: none"> <li>• For position control of double-acting pneumatic quarter turn actuators in process automation systems</li> <li>• Simple and efficient position control based on the PID control algorithm</li> <li>• Suitable for quarter turn actuators with a swivel angle of approx. 90° and a mechanical interface in accordance with VDI/VDE Directive 3845</li> <li>• Power supply 24 V DC</li> </ul>
online: →	<a href="#">cmsx</a>

4



## Safety systems

Type	 <p><b>Safety system</b> <b>CMGA-B1, CMGA-E1</b></p>
Safety function	Encoder Supervisor (ECS), Safe Torque Off (STO), Safely-Limited Acceleration (SLA), Safely Limited Speed (SLS), Safely-Limited Position (SLP), Safely-Limited Increment (SLI), Safe Emergency Limit (SEL), Safe Direction (SDI), Safe Brake Control (SBC), Safe Acceleration Range (SAR), Safe Operating Stop (SOS), Safe Cam (SCA), Safe Stop 1 (SS1), Safe Stop 2 (SS2), Position Deviation Muting (PDM), safe encoder evaluation, safe logic functions
Safety integrity level (SIL)	SIL 3
Encoder interface input, function	1 proximity sensor, 1 SSI, 1 incr. HTL, 1 incr. TTL, 1 sin/cos, 2 proximity sensors, 2 SSI, 2 incr. HTL, 2 incr. TTL, 2 sin/cos, no
Number of digital logic inputs	12 ... 14
Digital output design	1 safe relay output, 10 safe digital inputs/outputs, 2 signal outputs, 2 pulse outputs, 2 safe digital outputs
Description	<ul style="list-style-type: none"> <li>• Basic modules CMGA-B1 and extension modules CMGA-E1: one basic module can actuate max. two extension modules</li> <li>• Compact safety system with the option of integrated drive monitoring for one axis</li> <li>• For safe processing of emergency stop switches, door monitoring, light curtains, two-hand buttons, enabling buttons, limit switches, displacement encoders</li> <li>• Programming software GSPF for creating custom application programs</li> </ul>
online: →	<a href="#">cmga</a>

## Gear units


Type	 Gear unit <b>EMGA-SST</b>	 Gear unit <b>EMGA-SAS</b>
Continuous output torque	11 ... 110 Nm	11 ... 450 Nm
Max. drive speed	6500 ... 18000 rpm	6500 ... 18000 rpm
Torsional rigidity	1 ... 6 Nm/arc	1 ... 38 Nm/arc
Torsional backlash	0.12 ... 0.25°	0.1 ... 0.25°
Mass moment of inertia, gear unit	0.019 ... 0.77 kgcm <sup>2</sup>	0.019 ... 12.14 kgcm <sup>2</sup>
Max. efficiency	98%	98%
Description	<ul style="list-style-type: none"> <li>Planetary gear unit for stepper motors EMMS-ST</li> <li>Gear reduction <math>i = 3</math> and <math>5</math>, available ex-stock</li> <li>Life-time lubrication</li> </ul>	<ul style="list-style-type: none"> <li>Planetary gear unit for servo motors EMMS-AS</li> <li>Gear reduction <math>i = 3</math> and <math>5</math>, available ex-stock</li> <li>Life-time lubrication</li> </ul>
online: →	<a href="#">emga</a>	<a href="#">emga</a>

## Power supply units

Type	 Power supply unit <b>CACN</b>	 Power supply unit <b>SVG</b>
Nominal output voltage DC	24 ... 48 V	30.1 V
Nominal output current	5 ... 20 A	4.8 A
Input voltage range AC	100 ... 500 V	100 ... 240 V
Input current	0.9 ... 1.65 A, 1.5 ... 3.0 A, 2.2 ... 1.2 A, 2.3 ... 1.9 A, 5.1 ... 2.3 A	2.1 ... 1.0 A
Mains buffering	24 ... 110 ms	20 ms
Description	<ul style="list-style-type: none"> <li>H-rail mounting</li> <li>Mounting position: free convection</li> </ul>	<ul style="list-style-type: none"> <li>H-rail mounting</li> <li>Mounting position: free convection</li> </ul>
online: →	<a href="#">cacn</a>	<a href="#">svg</a>

## Software tool

**Product finder for grippers**







A secure grip is a question of the right calculation. In this case, calculation of weight, direction of movement, distances, etc. The software tool immediately determines which of the parallel, three-point, angle or swivel gripper units best matches your requirements, and in which size.





This tool can be found

- either in the electronic catalogue by clicking on the blue button "Product finder"
- or on the DVD under Engineering Tools.


## Parallel gripper

Type	 Parallel grippers DHPS	 Parallel grippers HGPD	 Parallel grippers HGPLE	 Parallel grippers HGPT-B
<b>Total gripping force at 6 bar, closing</b>	25 ... 910 N	94 ... 3716 N		106 ... 6300 N
<b>Stroke per gripper jaw</b>	2 ... 12.5 mm	3 ... 20 mm	40mm	1.5 ... 25 mm
<b>Position sensing</b>	Via Hall sensor, via proximity sensor	via proximity sensor	via integrated angular displacement encoder	via proximity sensor
<b>Gripping force backup</b>	during closing, during opening	during closing, during opening		during closing, during opening
<b>Description</b>	<ul style="list-style-type: none"> <li>• Sturdy and precise T-slot guidance of the gripper jaws</li> <li>• High gripping force and compact size</li> <li>• Max. repetition accuracy</li> <li>• Wide range of options for mounting on drives</li> </ul>	<ul style="list-style-type: none"> <li>• Ideal for very harsh environments</li> <li>• Precise gripping despite high torque loads</li> <li>• Max. gripping force at optimum installation space/force ratio</li> <li>• 8 sizes with up to 40 mm total stroke</li> <li>• Repetition accuracy of 0 ... 0.05 mm</li> </ul>	<ul style="list-style-type: none"> <li>• Electrically actuated gripper with long stroke</li> <li>• Free, speed-controlled selection of gripping positions</li> <li>• Long stroke allows use with workpieces of different sizes</li> <li>• Adjustable gripping force for highly sensitive and large, heavy workpieces</li> <li>• Very high torque resistance, very high accuracy</li> <li>• Short opening and closing times</li> <li>• Minimal installation costs</li> <li>• See product documentation for gripping force on our website</li> </ul>	<ul style="list-style-type: none"> <li>• Sturdy and powerful</li> <li>• With T-slot guide</li> <li>• Suitable for external and internal gripping</li> <li>• Protection against dust in gripper jaw guide via sealing air</li> <li>• High-force variant (F) available</li> </ul>
<b>online:</b> →	<a href="#">dhps</a>	<a href="#">hgpd</a>	<a href="#">hgple</a>	<a href="#">hgpt</a>

## Parallel gripper




Type	 Parallel grippers HGPL	 Parallel grippers HGPP	 Parallel grippers HGPC	 Parallel grippers HGP
Total gripping force at 6 bar, closing	158 ... 2742 N	80 ... 830 N	44 ... 126 N	160 ... 340 N
Stroke per gripper jaw	20 ... 150 mm	2 ... 12.5 mm	3 ... 7 mm	5 ... 7.5 mm
Position sensing	via proximity sensor	Via Hall sensor, via inductive sensors	via proximity sensor	via proximity sensor
Gripping force backup		during closing, during opening	during closing	
Description	<ul style="list-style-type: none"> <li>Space-saving, high forces and torques</li> <li>Controlled, precise and centred gripping</li> <li>Long stroke: long guide length for the gripper jaws</li> <li>Suitable for external and internal gripping</li> <li>Opening stroke can be adjusted to optimise time</li> </ul>	<ul style="list-style-type: none"> <li>High-precision gripper jaw guide</li> <li>Suitable for external and internal gripping</li> <li>Very flexible thanks to versatile attachment, mounting and application options</li> </ul>	<ul style="list-style-type: none"> <li>Compact, low cost, reliable operation, long service life</li> <li>High force with minimal volume</li> <li>Suitable for external and internal gripping</li> </ul>	<ul style="list-style-type: none"> <li>Double-acting piston drive</li> <li>With protective dust cap for use in dusty environments (protection class IP54)</li> <li>Self-centring</li> <li>Suitable for external and internal gripping</li> <li>High gripping force and compact size</li> <li>Max. repetition accuracy</li> <li>Internal fixed flow control</li> <li>Versatile thanks to externally adaptable gripper fingers</li> <li>Wide range of options for mounting on drive units</li> </ul>
online: →	<a href="#">hgpl</a>	<a href="#">hgpp</a>	<a href="#">hgpc</a>	<a href="#">hgp</a>

## Parallel gripper




Type	 Parallel grippers HGPM
Total gripping force at 6 bar, closing	16 ... 35 N
Stroke per gripper jaw	2 ... 3 mm
Position sensing	without
Gripping force backup	
Description	<ul style="list-style-type: none"> <li>Micro gripper: compact, handy design</li> <li>Versatile thanks to externally adaptable gripper fingers</li> <li>Mounting options with clamping spigot, with flange mounting, with Z stroke compensation</li> </ul>
online: →	<a href="#">hgpm</a>






## Three-point gripper

Type	 Three-point grippers DHDS	 Three-point grippers HGDD	 Three-point grippers HGDT
Total gripping force at 6 bar, closing	87 ... 750 N	336 ... 2745 N	207 ... 2592 N
Stroke per gripper jaw	2.5 ... 6 mm	4 ... 12 mm	1.5 ... 10 mm
Position sensing	Via Hall sensor, via proximity sensor	via proximity sensor	via proximity sensor
Gripping force backup	during closing	during closing, during opening	during closing, during opening
Description	<ul style="list-style-type: none"> <li>Sturdy and precise T-slot guidance of the gripper jaws</li> <li>High gripping force and compact size</li> <li>Max. repetition accuracy</li> <li>Wide range of options for mounting on drives</li> </ul>	<ul style="list-style-type: none"> <li>Ideal for very harsh environments</li> <li>Precise gripping with centric movements despite high torque loads</li> <li>5 sizes with up to 12 mm stroke/jaw</li> <li>Repetition accuracy of 0 ... 0.05 mm</li> </ul>	<ul style="list-style-type: none"> <li>Synchronous movement of gripper jaws</li> <li>With T-slot guide</li> <li>Suitable for external and internal gripping</li> <li>Dust-proof via sealing air</li> <li>High-force variant (F) available</li> </ul>
online: →	<a href="#">dhds</a>	<a href="#">hgdd</a>	<a href="#">hgdt</a>


## Angle gripper

Type	 Angle grippers DHWS	 Angle grippers HGWC	 Angle grippers HGWM
Total gripping torque at 6 bar, closing	30 ... 1362 Ncm	22 ... 144 Ncm	22 ... 64 Ncm
Max. opening angle	40°	30 ... 80°	14 ... 18.5°
Position sensing	Via Hall sensor, via proximity sensor	via proximity sensor	without
Gripping force backup	during closing		
Description	<ul style="list-style-type: none"> <li>Improved gripper jaw guide</li> <li>Link guided system</li> <li>Internal fixed flow control</li> <li>Max. repetition accuracy</li> <li>Wide range of options for mounting on drives</li> </ul>	<ul style="list-style-type: none"> <li>Internal fixed flow control, does away with the need for external flow control in 90% of applications</li> <li>High force with minimal volume</li> <li>Suitable for external and internal gripping</li> <li>Repetition accuracy 0.05 mm</li> <li>Compact and cost-effective</li> </ul>	<ul style="list-style-type: none"> <li>Micro angle gripper: compact, handy design</li> <li>Mounting options with clamping spigot, with flange mounting, with Z stroke compensation</li> <li>Versatile thanks to externally adaptable gripper fingers</li> </ul>
online: →	<a href="#">dhws</a>	<a href="#">hgwc</a>	<a href="#">hgwm</a>


## Radial grippers

Type	 <b>Radial grippers</b> <b>DHRS</b>	 <b>Radial grippers</b> <b>HGRT</b>	 <b>Radial grippers</b> <b>HGRC</b>
<b>Total gripping torque at 6 bar, closing</b>	15 ... 660 Ncm	158 ... 7754 Ncm	22 ... 144 Ncm
<b>Max. opening angle</b>	180°	180°	180°
<b>Position sensing</b>	Via Hall sensor, via proximity sensor	via proximity sensor, via inductive sensors	via proximity sensor
<b>Description</b>	<ul style="list-style-type: none"> <li>• Lateral gripper jaw support for high torque loads</li> <li>• Self-centring</li> <li>• Gripper jaw centring options</li> <li>• Max. repetition accuracy</li> </ul>	<ul style="list-style-type: none"> <li>• Secure gripping thanks to precise, polished plain-bearing guides</li> <li>• Gripping force backup via compression springs holds the gripped workpiece securely in the event of a pressure failure</li> <li>• Compression spring also boosts the gripping force for applications involving heavier loads</li> <li>• Optimum cycle times thanks to freely adjustable opening angle of up to max. 90° per gripper finger. This prevents possible collisions due to the gripper jaws opening too wide</li> </ul>	<ul style="list-style-type: none"> <li>• Internal fixed flow control, does away with the need for external flow control in 90% of applications</li> <li>• High force with minimal volume</li> <li>• Suitable for external and internal gripping</li> <li>• Repetition accuracy 0.05 mm</li> <li>• Compact and cost-effective</li> </ul>
<b>online: →</b>	<a href="#">dhrs</a>	<a href="#">hgtr</a>	<a href="#">hgrc</a>

## Swivel/gripper units


Type	 <b>Swivel/gripper unit</b> <b>HGDS</b>
<b>Total gripping force at 6 bar, closing</b>	74 ... 168 N
<b>Stroke per gripper jaw</b>	2.5 ... 7 mm
<b>Swivel angle</b>	210°
<b>Position sensing, gripper</b>	Via proximity sensor
<b>Description</b>	<ul style="list-style-type: none"> <li>• Combination of parallel gripper and swivel module</li> <li>• Swivel angle infinitely adjustable</li> <li>• Precise end stop with elastic cushioning or integrated shock absorber</li> </ul>
<b>online: →</b>	<a href="#">hgds</a>

## Bellows grippers



	
Type	<b>Bellows grippers</b> <b>DHEB</b>
Bellows stroke	3,5 ... 25 mm
Min. diameter to be gripped	8 ... 66 mm
Max. diameter to be gripped	11 ... 85 mm
Max. operating frequency of gripper	0 ... 4 Hz
Description	<ul style="list-style-type: none"> <li>• 11 sizes for 8 to 85 mm gripping diameter</li> <li>• Upwards or downwards direction of movement of bellows</li> <li>• Different bellows materials EPDM or silicone</li> <li>• Air connection on the side, or from above</li> <li>• Optimised process sequence with increased quality: prevents the workpieces from being scratched</li> <li>• Additional reliability: optional sensing via proximity or position sensor</li> </ul>
online: →	<a href="#">dheb</a>

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## Software tool

<p><b>Feed separator</b></p> 	<p>This tool helps you to select the right separator of the type HPV from Festo for your application. Let yourself be guided by the program and enter your general parameters and you will receive at least one suggestion for the product best suited to your application.</p>	<p>This tool can be found</p> <ul style="list-style-type: none"> <li>• either in the electronic catalogue by clicking on the blue button "Engineering"</li> <li>• or on the DVD under Engineering Tools.</li> </ul>
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## Feed separator

		
Type	<b>Feed separator</b> <b>HPVS</b>	<b>Feed separator</b> <b>HPV</b>
Mode of operation	Double-acting	Double-acting
Piston diameter	10mm, 14mm, 22mm	10mm, 14mm, 22mm
Stroke	10 ... 60 mm	20 ... 60 mm
Theoretical force at 6bar, advancing	45 ... 225 N	45 ... 225 N
Description	<ul style="list-style-type: none"> <li>• Version with one plunger</li> <li>• With non-rotating piston rod</li> <li>• Proximity sensors suitable for integration in the housing can be used (type SME/SMT-8)</li> </ul>	<ul style="list-style-type: none"> <li>• Version with two plungers</li> <li>• With twin pistons, piston rods, non-rotating and locking mechanism</li> <li>• Cost-effective: replaces at least two drives in the feed process</li> <li>• Proximity sensors suitable for integration in the housing can be used (type SME/SMT-8)</li> </ul>
online: →	<a href="#">hpvs</a>	<a href="#">hpv</a>

## Software tool





**Configurator**

Design a product with numerous features reliably and quickly with the help of the configurator. Select all the required product features step-by-step. The use of logic checks ensures that only correct configurations are available for selection.





The configurator is part of the electronic catalogue and is not available as a separate software program.

## Handling modules


	
<b>Handling module HSP</b>	<b>Handling module, pneumatic HSW-AP, HSW-AS</b>
<b>Type</b>	
<b>Size</b>	12, 16, 25
<b>Theoretical force at 6 bar</b>	40 ... 65 N
<b>Minimum cycle time</b>	0.6 ... 1 s
<b>Y stroke</b>	52 ... 170 mm
<b>Z stroke</b>	20 ... 70 mm
<b>Repetition accuracy</b>	+/-0.01 mm, +/-0.02 mm
<b>Description</b>	<ul style="list-style-type: none"> <li>• Function module for the automatic transfer, feed and removal of small parts in extremely confined spaces</li> <li>• Guided vertical and horizontal motion sequence</li> <li>• High precision and good rigidity</li> <li>• Compact design</li> <li>• Extremely short cycle times</li> <li>• Cost-optimised</li> <li>• Stroke adjustment along Y- and Z-axes</li> </ul>
<b>online:</b> →	<a href="#">hsp</a>
	<a href="#">hsw</a>

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### Cartesian systems

				
<b>Type</b>	<b>Single-axis system</b> YXCS	<b>2D linear gantry</b> YXCL	<b>2D gantry</b> YXCF	<b>2D gantry</b> EXCM
<b>Stroke</b>	3000 mm	Y: max. 3000 mm, Z: 800 mm	X: max. 3000 mm, Y: 2000 mm	X: max. 700 mm, Y: 360 mm
<b>modules</b>	electrical	Y: electrical, Z: electrical and pneumatic	X: electrical, Y: electrical	X: electrical, Y: electrical
<b>Payload</b>	Dependent on the selected dynamic response	Dependent on the selected dynamic response	Dependent on the selected dynamic response	0 ... max. 3 kg
<b>Description</b>	<ul style="list-style-type: none"> <li>• Ready-to-install single-axis solution including energy chain for cable and tubing routing as well as matching motor and motor controller package</li> <li>• For any single-axis movement</li> <li>• Ideal for long gantry strokes and heavy loads</li> <li>• High mechanical rigidity and sturdy design</li> </ul>	<ul style="list-style-type: none"> <li>• Ideal for long gantry strokes and heavy loads</li> <li>• High mechanical rigidity and sturdy design</li> <li>• Frequently used in feeding or loading applications</li> <li>• Use of tried and tested drives/axes from Festo</li> </ul>	<ul style="list-style-type: none"> <li>• Can be used universally for handling light to heavy workpieces or high payloads</li> <li>• Especially suitable for very long strokes</li> <li>• High mechanical rigidity and sturdy design</li> <li>• Freely positionable/any intermediate positions</li> </ul>	<ul style="list-style-type: none"> <li>• Excellent functionality in a very small fitting space</li> <li>• Small moving loads</li> <li>• Actuation via two stepper motors with integrated optical encoder and two-axis controller</li> <li>• With plain or recirculating ball bearing guide</li> </ul>
<b>online:</b> →	<a href="#">yxcs</a>	<a href="#">yxcl</a>	<a href="#">yxcf</a>	<a href="#">excm</a>

### Cartesian systems


	
<b>Type</b>	<b>3D gantry</b> YXCR
<b>Stroke</b>	X: max. 3000 mm, Y: 2000 mm, Z: 800 mm
<b>modules</b>	X: electrical, Y: electrical, Z: electrical or pneumatic
<b>Payload</b>	Dependent on the selected dynamic response
<b>Description</b>	<ul style="list-style-type: none"> <li>• Can be used universally for handling light to heavy workpieces or high payloads</li> <li>• Especially suitable for very long strokes</li> <li>• High mechanical rigidity and sturdy design</li> <li>• Pneumatic and electric components – freely combinable</li> <li>• As an electrical solution – freely positionable/any intermediate positions</li> </ul>
<b>online:</b> →	<a href="#">yxcr</a>

## Parallel kinematic systems

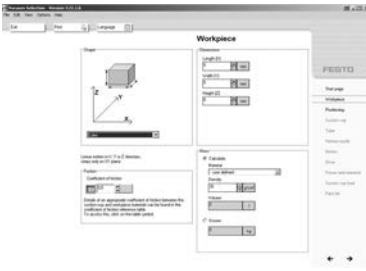
<p>Type</p>	 <p>Parallel kinematic system, tripod EXPT</p>
<p>Max. payload</p>	<p>5kg</p>
<p>Working space nominal diameter</p>	<p>450 ... 1200 mm</p>
<p>Working space nominal height</p>	<p>100mm</p>
<p>Max. picking rate</p>	<p>150 picks/min in 12" cycle</p>
<p>Description</p>	<ul style="list-style-type: none"> <li>• Low moving mass – ideal for demanding requirements on dynamic response in three dimensions</li> <li>• Great path accuracy with a range of path profiles, even for very dynamic operation</li> </ul>
<p>online: →</p>	<p><a href="#">expt</a></p>

## Control systems





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<p>Type</p>	 <p>Control system CMCA</p>
<p>Electrical connection</p>	<p>spring-loaded terminal</p>
<p>Mains voltage AC</p>	<p>230/400 V</p>
<p>Nominal operating voltage phases</p>	<p>3-phase</p>
<p>Mains frequency</p>	<p>50 ... 60 Hz</p>
<p>Safety function</p>	<p>Safe Stop 1 (SS1)</p>
<p>Description</p>	<ul style="list-style-type: none"> <li>• Control solution for handling systems from Festo</li> <li>• Available on a mounting plate with or without control cabinet housing</li> <li>• Includes the multi-axis controller CMXR and the motor controller CMMP required for actuation</li> </ul>
<p>online: →</p>	<p><a href="#">cmca</a></p>

## Software tool





<b>Vacuum selection</b>		<p>Which suction cup for which surface and which movement? Don't experiment – calculate! This software tool even enables a differentiation to be made between linear and rotary movements.</p>	<p>This tool can be found</p> <ul style="list-style-type: none"> <li>• either in the electronic catalogue by clicking on the blue button "Engineering"</li> <li>• or on the DVD under Engineering Tools.</li> </ul>
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## Vacuum generators


Type	 <b>Vacuum generator OVEM</b>	 <b>Vacuum generator, pneumatic VN</b>	 <b>Vacuum generator VAD</b>	 <b>Vacuum generator VAK</b>
<b>Nominal width of laval nozzle</b>	0.45 ... 2.0 mm	0.45 ... 3 mm	0.5 ... 1.5 mm	1mm
<b>Ejector characteristics</b>	Standard, high suction rate, High vacuum	In-line, Standard, high suction rate, High vacuum	High vacuum	High vacuum
<b>Integrated function</b>	Electric ejector pulse valve, flow control, electric on-off valve, Filterfilter, electric air-saving circuit, non-return valve, open silencer, vacuum switch	Pneumatic ejector pulse, open silencer, vacuum switch		Pneumatic ejector pulse
<b>Max. vacuum</b>	93%	86 ... 93 %	80%	80%
<b>Max. suction rate with respect to atmosphere</b>	6 ... 92 l/min	6.1 ... 339 l/min		
<b>Description</b>	<ul style="list-style-type: none"> <li>• Compact design</li> <li>• Monitoring and visualisation of the vacuum by means of vacuum sensor with LCD display</li> <li>• Central electrical connection via an M12 plug</li> <li>• Maintenance-free operation and reduced noise level through an integrated, open silencer</li> <li>• Integrated filter with inspection window for maintenance display</li> <li>• Adjustable ejector pulse</li> </ul>	<ul style="list-style-type: none"> <li>• Can be used directly in the work space</li> <li>• Available as straight type (inline: vacuum port in line with the supply port) or T-shape (standard: vacuum port at 90° to the supply port)</li> <li>• Cost-effective</li> <li>• No wearing parts</li> </ul>	<ul style="list-style-type: none"> <li>• Sturdy aluminium housing</li> <li>• Connection for external reservoir</li> <li>• Maintenance-free</li> <li>• See product documentation on our website for max. suction rate</li> </ul>	<ul style="list-style-type: none"> <li>• Sturdy aluminium housing</li> <li>• Connection for external reservoir</li> <li>• Built-in reservoir</li> <li>• Reliable setting down of workpieces</li> <li>• See product documentation on our website for max. suction rate</li> </ul>
<b>online:</b> →	<a href="#">ovem</a>	<a href="#">vn</a>	<a href="#">vad</a>	<a href="#">vak</a>

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## Vacuum generators





				
Type	Vacuum generator, electropneumatic VN	Vacuum generator VADM, VADMI	Vacuum generator VAD-M, VAD-M-I	Vacuum generator for valve terminal CPV CPV10-M1H, CPV14-M1H, CPV18-M1H
Nominal width of laval nozzle	0.45 ... 3 mm	0.45 ... 3 mm	0.7 ... 2 mm	0.7 ... 1.4 mm
Ejector characteristics	Standard, high suction rate, High vacuum	High vacuum	High vacuum	High vacuum
Integrated function	Pneumatic ejector pulse, electric on-off valve	Electric ejector pulse valve, flow control, electric on-off valve, Filterfilter, electric air-saving circuit, non-return valve, vacuum switch	Electric ejector pulse valve, electric on-off valve	
Max. vacuum	92 ... 93 %	85%	85 ... 90 %	85%
Max. suction rate with respect to atmosphere	7.2 ... 186 l/min			
Description	<ul style="list-style-type: none"> <li>• Can be used directly in the work space</li> <li>• Cost-effective</li> <li>• No wearing parts</li> <li>• With solenoid valve vacuum ON/OFF</li> </ul>	<ul style="list-style-type: none"> <li>• Compact and sturdy design</li> <li>• Built-in solenoid valve (on/off)</li> <li>• Filter with contamination indicator</li> <li>• Available with air-saving circuit, vacuum switch</li> <li>• Reliable setting down of workpieces</li> <li>• See product documentation on our website for max. suction rate</li> </ul>	<ul style="list-style-type: none"> <li>• Compact and sturdy design</li> <li>• Built-in solenoid valve (on/off)</li> <li>• Reliable setting down of workpieces</li> <li>• Maintenance-free because there are no moving parts</li> </ul>	<ul style="list-style-type: none"> <li>• Combinations with a number of vacuum generators are possible on the same valve terminal</li> <li>• With solenoid valve vacuum ON/OFF</li> <li>• With or without ejector pulse</li> </ul>
online: →	<a href="#">vn</a>	<a href="#">vadm</a>	<a href="#">vad-m</a>	<a href="#">cpv10-m1h</a>

## Vacuum generators


	
Type	Vacuum generator cartridge VN
Nominal width of laval nozzle	0.45 ... 2 mm
Ejector characteristics	Standard, high suction rate, High vacuum
Integrated function	
Max. vacuum	92... 93 %
Max. suction rate with respect to atmosphere	7.2 ... 184 l/min
Description	<ul style="list-style-type: none"> <li>• For fitting into customised housing for decentralised vacuum generation</li> </ul>
online: →	<a href="#">vn</a>




### Vacuum gripping technology

Type	 <b>Bernoulli gripper</b> OGGB	 <b>Suction gripper</b> ESG	 <b>Suction cup</b> ESS	 <b>Suction cup</b> ESV
Suction cup size		10x30 mm, 15x45 mm, 20x60 mm, 25x75 mm, 30x90 mm, 4x10 mm, 4x20 mm, 6x10 mm, 6x20 mm, 8x20 mm, 8x30 mm	10x30 mm, 15x45 mm, 20x60 mm, 25x75 mm, 30x90 mm, 4x10 mm, 4x20 mm, 6x10 mm, 6x20 mm, 8x20 mm, 8x30 mm	
Suction cup diameter	60 mm, 100 mm, 140 mm	2 ... 200 mm	2 ... 200 mm	20 ... 200 mm
Breakaway force at 70% vacuum		0.1 ... 1610 N	0.1 ... 1610 N	9.8 ... 1610 N
Design		Oval, flat, round, bellows 1.5 convolutions, round, bellows 3.5 convolutions, round, deep, round, flat, round, extra deep	Oval, flat, round, bellows 1.5 convolutions, round, bellows 3.5 convolutions, round, deep, round, flat, round, extra deep	round, bellows 1.5 convolutions, round, bellows 3.5 convolutions, round, deep, round, flat, round, extra deep
Information on suction cup materials	POM, NBR	FPM, NBR, PUR, TPE-U(PU), VMQ (silicone), BR	FPM, NBR, PUR, TPE-U(PU), VMQ (silicone), BR	FPM, NBR, PUR, TPE-U(PU), VMQ (silicone), BR
Description	<ul style="list-style-type: none"> <li>Ideally suited to transporting thin, extremely delicate and brittle workpieces</li> <li>Minimised workpiece contact, gentle workpiece handling</li> <li>Low energy costs thanks to minimised air consumption</li> <li>Minimal assembly and installation</li> </ul>	<ul style="list-style-type: none"> <li>Modular system of suction cup holders and suction cups with over 2000 variants</li> <li>Available with angle compensator, height compensator, filter</li> <li>15 suction cup diameters</li> <li>6 suction cup shapes</li> <li>Suction cup volume: 0.002 ... 245cm<sup>3</sup></li> <li>Min. workpiece radius: 10 ... 680 mm</li> <li>Vacuum port: push-in connector or barbed fitting for plastic tubing, threaded connection</li> </ul>	<ul style="list-style-type: none"> <li>Suction cup consisting of the suction cup itself, plus the support plate with mounting</li> <li>Suction cup volume: 0.002 ... 245cm<sup>3</sup></li> <li>Min. workpiece radius: 10 ... 680 mm</li> <li>Mounting for suction cup holder: female thread, male thread, push-in connector</li> </ul>	<ul style="list-style-type: none"> <li>Suction cup wearing part</li> <li>Easily interchangeable</li> <li>Suction cup volume: 0.318 ... 245cm<sup>3</sup></li> <li>Min. workpiece radius: 10 ... 680 mm</li> </ul>
online: →	<a href="#">oggb</a>	<a href="#">esg</a>	<a href="#">ess</a>	<a href="#">esv</a>





### Vacuum gripping technology

Type	 <b>Suction cup</b> VAS, VASB
Suction cup size	
Suction cup diameter	2 ... 125 mm
Breakaway force at 70% vacuum	0.14 ... 606 N
Design	Vacuum port on top, vacuum port on side, round, bellows 1.5 convolutions, round, flat
Information on suction cup materials	NBR, PUR, TPE-U(PU), VMQ (silicone)
Description	<ul style="list-style-type: none"> <li>Sturdy and reliable</li> <li>Suction cups with fixed connecting thread</li> <li>11 suction cup diameters</li> <li>Round suction cup shape, bellows</li> <li>Vacuum port on top, at side</li> <li>Free of copper, PTFE and silicone</li> <li>Screw-in thread</li> </ul>
online: →	<a href="#">vas</a>





## Assembly and connection components

<b>Type</b>	 <b>Suction cup holder</b> <b>ESH</b>
<b>Design</b>	Vacuum port on top, vacuum port on side, with height compensator
<b>Description</b>	<ul style="list-style-type: none"> <li>• With or without height compensator</li> <li>• 6 holder sizes</li> <li>• 8 holder types</li> <li>• 3 tubing connections</li> </ul>
<b>online:</b> →	<a href="#">esh</a>

## Standard directional control valves

Type	 Solenoid valve VSNC	 Standard valve with central plug VSVA-R5, VSVA-R2	 Standard valve with square plug VSVA-C1	 Standard valve, plug-in VSVA-T1
Type of actuation	electrical	electrical	electrical	electrical
Pneumatic connection 1	G1/4, NPT 1/4	Connecting plate size 42 mm to ISO 5599-1, Connecting plate size 52 mm to ISO 5599-1	Connecting plate size 18 mm to ISO 15407-1, Connecting plate size 26 mm to ISO 15407-1	Connecting plate size 1 to ISO 5599-2, Connecting plate size 2 to ISO 5599-2, Connecting plate size 18 mm to ISO 15407-2, Connecting plate size 26 mm to ISO 15407-2
Nominal flow rate	950 ... 1350 l/min, 90 ... 780 l/min	400 ... 2800 l/min	400 ... 1100 l/min	400 ... 2900 l/min
Valve function	5/2-way, double-solenoid, 5/2 or 3/2, convertible, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	5/2-way, double-solenoid, 5/2-way, double-solenoid dominant signal, 5/2-way, single solenoid, 5/3-way, closed, 5/3-way, exhausted, 5/3-way, pressurised, 2x3/2-way, closed, single solenoid, 3/2-way, single solenoid, open/closed, 2x3/2-way, open/closed, single solenoid, 2x3/2-way, open, single solenoid	5/2-way, double-solenoid, 5/2-way, double-solenoid dominant signal, 5/2-way, single solenoid, 5/3-way, closed, 5/3-way, exhausted, 5/3-way, pressurised, 2x3/2-way, closed, single solenoid, 2x3/2-way, open/closed, single solenoid	5/2-way, single solenoid, 5/2-way, double-solenoid, 5/2-way, double-solenoid dominant signal, 5/3-way, connection 2 pressurised, 4 exhausted, 5/3-way, closed, 5/3-way, exhausted, 5/3-way, pressurised 1 to 2, 4 to 5 closed, 5/3-way, pressurised, 2x2/2-way, closed, single solenoid, 2x3/2-way, closed, single solenoid, 2x3/2-way, open, single solenoid, 2x3/2-way, open/closed, single solenoid
Electrical connection	3-pin, shape B, to industry standard (11 mm), plug connector	3-pin, 4-pin, M12x1, M8x1, round design, central plug	type C, with protective earth conductor, to DIN EN 175301-803, to EN 175301-803, without protective earth conductor	2-pin, 4-pin, to ISO 15407-2, to ISO 5599-2, plug-in, plug connector
Description	<ul style="list-style-type: none"> <li>Namur interface ideal for use on process valves in many industry segments and applications e.g. in chemicals, biotech/pharmaceuticals, water/wastewater</li> <li>Rotatable seal for 3/2 or 5/2-way valve</li> <li>Wide choice of EX solenoid systems</li> <li>Sturdy and powerful</li> <li>Extended temperature range</li> <li>Outstanding value for money</li> </ul>	<ul style="list-style-type: none"> <li>Corresponds to ISO 15407-1 and to ISO 15218 for pilot valve with interface</li> <li>High-performance valves in sturdy metal housing</li> <li>Manifold assembly with mixed sizes possible</li> <li>Wide range of vertical stacking modules: flow control plate, vertical pressure shut-off plate, pressure-reducing valve, etc.</li> </ul>	<ul style="list-style-type: none"> <li>Corresponds to ISO 15407-1 and to ISO 15218 for pilot valve with interface</li> <li>High-performance valves in sturdy metal housing</li> <li>Manifold assembly with mixed sizes possible</li> <li>Wide range of vertical stacking modules: flow control plate, vertical pressure shut-off plate, pressure-reducing valve, etc.</li> </ul>	<ul style="list-style-type: none"> <li>For valve terminal VTSA/VTSA-F</li> <li>High-performance valves in sturdy metal housing</li> </ul>
online: →	<a href="#">vsnc</a>	<a href="#">vsva</a>	<a href="#">vsva</a>	<a href="#">vtsa</a>

## Standard directional control valves

				
Type	Pneumatic valve, ISO 15407-1 VSPA	Solenoid valve, ISO 5599-1 MN1H, MFH, MDH, MEBH, MDH, JMN1H, JMN1DH, JMFH, JMFDH, JMDH, JMEBH, JMEBDH, JMDDH	Pneumatic valve, ISO 5599-1 VL, J, JD	Standard valve to ISO 15218 (CNOMO) MD, MDH, MGXDH, MGXIAH, VSCS
Type of actuation	pneumatic	electrical	pneumatic	electrical
Pneumatic connection 1	Connecting plate size 18 mm to ISO 15407-1, Connecting plate size 26 mm to ISO 15407-1	Connecting plate, Connecting plate size 1 to ISO 5599-1, Connecting plate size 2 to ISO 5599-1, Connecting plate size 3 to ISO 5599-1, Connecting plate size 4 to ISO 5599-1	Connecting plate size 1 to ISO 5599-1, Connecting plate size 2 to ISO 5599-1, Connecting plate size 3 to ISO 5599-1, Connecting plate size 4 to ISO 5599-1	Connecting plate
Nominal flow rate	400 ... 1100 l/min	1100 ... 6000 l/min	1200 ... 6000 l/min	13 ... 50 l/min
Valve function	2x3/2-way, closed, single solenoid, 2x3/2-way, open, single solenoid, 2x3/2-way, open/closed, single solenoid, 5/2-way, double-solenoid, 5/2-way, double-solenoid dominant signal, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	5/2-way, double-solenoid, 5/2-way, double-solenoid dominant signal, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	5/2-way, double-solenoid, 5/2-way, double-solenoid dominant signal, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	3/2-way, closed, single solenoid
Electrical connection		type A, M12x1, plug connector, central plug, according to DIN 43650, round design, square design		type A, type C, M12x1, to DIN EN 175301-803, to IEC 61076-2-101
Description	<ul style="list-style-type: none"> <li>Sturdy metal design</li> <li>Manifold assembly with mixed sizes possible</li> <li>Wide range of vertical stacking modules: pressure regulator, flow control valve, vertical pressure shut-off plate, etc.</li> </ul>	<ul style="list-style-type: none"> <li>Sturdy metal design</li> <li>ISO size 1, 2, 3 and 4</li> <li>Manifold assembly with mixture of ISO sizes 1/2/3 possible</li> <li>Extensive range of electrical connection options</li> <li>Wide range of vertical stacking modules: pressure regulator, flow control valve, vertical pressure shut-off plate, etc.</li> <li>Also available as a valve terminal</li> </ul>	<ul style="list-style-type: none"> <li>Sturdy metal design</li> <li>ISO size 1, 2, 3 and 4</li> <li>Individual assembly, manifold assembly</li> </ul>	<ul style="list-style-type: none"> <li>CNOMO port pattern, to ISO 15218</li> <li>Pilot valve with and without manual override</li> </ul>
online: →	<a href="#">vspa</a>	<a href="#">iso 5599-1</a>	<a href="#">iso 5599-1</a>	<a href="#">iso 15218</a>





## Standard directional control valves

Type	<b>Solenoid valve, NAMUR (VDE, VDI 3845)</b> NVF3, MFH, MN1H, MGTBH, VSNB
Type of actuation	electrical
Pneumatic connection 1	Connecting plate, G1/4
Nominal flow rate	400 ... 1000 l/min
Valve function	5/2-way, double-solenoid, 5/2-way and 3/2-way, single solenoid, 5/2-way, single solenoid, 5/2-way or 3/2-way, single solenoid
Electrical connection	socket, type A, M20x1.5, according to DIN 43650, to DIN EN 175301-803, screw terminal, plug connector, square design
Description	<ul style="list-style-type: none"> <li>• Port pattern to NAMUR</li> <li>• Direct mounting on drives</li> <li>• Optional variants for use in Ex zone I</li> <li>• Flat design</li> </ul>
online: →	<a href="#">namur</a>





## Universal directional control valves

Type	<b>Solenoid valve VUVS</b>	<b>Pneumatic valve VUWS</b>	<b>Pneumatic valve VUWG</b>	<b>Solenoid valve, plug-in VUVG</b>
Type of actuation	electrical	pneumatic	pneumatic	electrical
Pneumatic connection 1	G1/8, G1/4	G1/8, G1/4	G1/8, M3, M5, M7	G1/4, G1/8, M3, M5, M7
Nominal flow rate	600 ... 1300 l/min	600 ... 1300 l/min	90 ... 780 l/min	80 ... 1380 l/min
Valve function	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 5/2-way, double-solenoid, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 5/2-way, double-solenoid, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	2x3/2-way, closed, single solenoid, 2x3/2-way, open, single solenoid, 2x3/2-way, open/closed, single solenoid, 5/2-way, double-solenoid, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	2x3/2-way, closed, single solenoid, 2x3/2-way, open, single solenoid, 2x3/2-way, open/closed, single solenoid, 3/2-way, closed, single solenoid, 3/2 open, single solenoid, 5/2-way, double-solenoid, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed, 2x3/2-way, closed, single solenoid, 2x3/2-way, open/closed, single solenoid, 2x3/2-way, open, single solenoid
Electrical connection	type C			via E-box
Description	<ul style="list-style-type: none"> <li>• A reliable, robust valve with a long service life</li> <li>• Low-cost universal valve with no performance limitations</li> <li>• In-line valves can be used as individual valves or manifold valves for valve manifold VTUS</li> </ul>	<ul style="list-style-type: none"> <li>• A reliable, robust valve with a long service life</li> <li>• Low-cost universal valve with no performance limitations</li> <li>• In-line valves can be used as individual valves or manifold valves for valve manifold VTUS</li> </ul>	<ul style="list-style-type: none"> <li>• Compact universal valve</li> <li>• Easy mounting</li> <li>• High flow rate relative to its size</li> <li>• Can be mounted as individual valve or connecting plate valve on a sturdy aluminium manifold rail</li> <li>• Individual valve of VG series</li> </ul>	<ul style="list-style-type: none"> <li>• Specific I-Port interface from Festo for bus node</li> <li>• I/O link mode for direct connection to a higher-order I/O link master</li> <li>• Festo-specific I-Port interface with interlock</li> <li>• Variable multi-pin plug connection using Sub-D or flat cable</li> <li>• Reversible piston spool valves, up to 24 valve positions</li> </ul>
online: →	<a href="#">vuvs</a>	<a href="#">vuws</a>	<a href="#">vuwg</a>	<a href="#">vuvg</a>




## Universal directional control valves

				
Type	Solenoid valve, for individual connection <b>VUVG</b>	Solenoid valve <b>VUVB</b>	Solenoid valve <b>CPE10, CPE14, CPE18, CPE24</b>	Solenoid valve <b>VMPA1, VMPA14, VMPA2</b>
Type of actuation	electrical	electrical	electrical	electrical
Pneumatic connection 1	G1/4, G1/8, M3, M5, M7	Connecting plate, QS-4, QS-6, QS-8, QS-10	G1/8, G1/4, G3/8, M5, M7, QS-4, QS-6, QS-8, QS-10, QS-12	G1/8, M7
Nominal flow rate	130 ... 630 l/min	200 ... 1000 l/min	180 ... 3200 l/min	360 ... 870 l/min
Valve function	2x3/2-way, closed, single solenoid, 2x3/2-way, open, single solenoid, 2x3/2-way, open/closed, single solenoid, 3/2-way, closed, single solenoid, 3/2 open, single solenoid, 5/2-way, double-solenoid, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 4/2-way, double-solenoid, 4/2-way, single solenoid	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 5/2-way, double-solenoid, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	2x2/2-way, closed, single solenoid, 2x3/2-way, closed, single solenoid, 2x3/2-way, open, single solenoid, 2x3/2-way, open/closed, single solenoid, 3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 5/2-way, double-solenoid, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed
Electrical connection	via connecting plate	type C, socket for multi-pin plug, plug connector, to EN 175301-803, via connecting plate	2-pin, 4-pin, type C, M8x1	4-pin, M8x1, plug connector
Description	<ul style="list-style-type: none"> <li>• Connection technology via E-box</li> <li>• Sturdy and durable metal components</li> <li>• In-line valves can be used as individual valves or manifold valves</li> <li>• Individual valve of VG series</li> </ul>	<ul style="list-style-type: none"> <li>• In-line valve</li> <li>• Semi in-line valve</li> <li>• Connecting plates for individual valves</li> <li>• Manifold rail for valve manifold with individual electrical connection or for valve terminal with electrical multi-pin connection</li> </ul>	<ul style="list-style-type: none"> <li>• High flow rate relative to its size</li> <li>• Wide range of functions</li> <li>• Comprehensive valve range</li> </ul>	<ul style="list-style-type: none"> <li>• Supplements the valve terminals MPA</li> <li>• Mounted on individual connecting plate</li> <li>• Comprehensive valve range</li> </ul>
online: →	<a href="#">vuvg</a>	<a href="#">vuvb</a>	<a href="#">cpe</a>	<a href="#">vmpa1</a>

## Universal directional control valves





				
Type	Solenoid valve, pneumatic valve, Tiger 2000 MFH, MVH, JMFH, JMVH, VL, J	Solenoid valve, pneumatic valve, Tiger Classic MFH, MOFH, JMFH, JMFDH, VL/O, VL, JH, JDH	Solenoid valve, pneumatic valve, midi pneumatic MEBH, MOEBH, MEH, MOEH, JMEBH, JMEH, VL, J	Cassette valve C, CJ, CJM, CL, CM
Type of actuation	electrical, pneumatic	electrical, pneumatic	electrical, pneumatic	electrical, pneumatic
Pneumatic connection 1	Connecting plate, G1/4, G1/8, G3/8	Connecting plate, G1/2, G1/4, G1/8, G3/4	Connecting plate, G1/8	Connecting plate, G1/4, G1/2
Nominal flow rate	700 ... 2600 l/min	500 ... 7500 l/min	200 ... 700 l/min	1400l/min
Valve function	5/2-way, double-solenoid, 5/2-way, closed, single solenoid, 5/2-way, single solenoid, 5/3- way, pressurised, 5/3-way, exhausted, 5/3-way, closed	3/2-way, closed, single sole- noid, 3/2-way, open, single sole- noid, 5/2-way, double-solenoid, 5/2-way, double-solenoid do- minant signal, 5/2-way, closed, single solenoid, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 5/2-way, double-solenoid, 5/2- way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	5/2-way, double-solenoid, 5/2-way, single solenoid
Electrical connection	type B, to EN 175301-803, via F coil, to be ordered separately	via F coil, to be ordered separately	plug connector, square design to EN 175301-803, type C	
Description	<ul style="list-style-type: none"> <li>Sturdy and reliable</li> <li>Wide range of voltages</li> </ul>	<ul style="list-style-type: none"> <li>Sturdy and reliable</li> <li>Wide range of voltages</li> <li>All-metal valve</li> </ul>	<ul style="list-style-type: none"> <li>Semi in-line valve</li> <li>Connecting plate valve</li> <li>Midi pneumatic: 18 mm width</li> <li>Manifold assembly for 2 ... 10 valves or individual mounting</li> <li>Operating voltage 24 V DC, 110/230 V AC (50 ... 60 Hz)</li> </ul>	<ul style="list-style-type: none"> <li>Sturdy</li> <li>For direct assembly on connecting plate</li> <li>With and without manual override</li> </ul>
online: →	<a href="#">tiger 2000</a>	<a href="#">tiger classic</a>	<a href="#">mebh</a>	<a href="#">cm</a>

## Universal directional control valves





			
Type	<b>Solenoid valves – supplementary range</b> BMCH, BMFH, JMC, JMF, MC, MCH, MF, MFH, MLC, MOCH, MOFH	<b>Pneumatic valves – supplementary range</b> A, VL	<b>Basic valve</b> LC
Type of actuation	electrical		pneumatic, electrical
Pneumatic connection 1	Connecting plate, M5, G1/8, G1/4, G1/2, G3/8, G3/4	G1/4, G3/8, PK-3	G1/8, G1/4
Nominal flow rate	46 ... 7500 l/min	105 ... 1800 l/min	80 ... 600 l/min
Valve function	2/2-way, closed, single solenoid, 2x3/2-way, closed, single solenoid, 3/2-way, closed, sin- gle solenoid, 3/2-way, open, single solenoid, 3x3/2-way, closed, single solenoid, 4/2-way, double-solenoid, 4/2-way, single solenoid, 5/2-way, single solenoid, 5/3-way, pressuri- sed, 5/3-way, exhausted, 5/3-way, closed, 5/4-way, closed	5/2-way, double-solenoid, 5/2-way, single solenoid, 8/2-way, single solenoid	3/2 directly actuated, 5/4 indirectly actuated
Electrical connection	plug connector, via F coil, to be ordered separately		
Description	<ul style="list-style-type: none"> <li>• With and without manual override</li> <li>• Manifold mounting or individual valve</li> <li>• MC valves are suited especially for posi- tioning, for stopping in the event of an emergency stop and for holding double-ac- ting cylinders in any position</li> </ul>	<ul style="list-style-type: none"> <li>• For activating cylinders for single stroke and oscillating movements</li> <li>• For positioning, for stopping in the event of an emergency stop and for holding double-acting cylinders in any position</li> <li>• For controlling the functions of pneumatic feed units such as feed motions and reciprocal clamping</li> <li>• They can be actuated manually via an operating lever, mechanically via a control stem or pneumatically</li> </ul>	<ul style="list-style-type: none"> <li>• Screw-in actuator attachments</li> <li>• For positioning, for stopping in the event of an emergency stop and for holding double-acting cylinders in any position</li> </ul>
online: →	<a href="#">bmch</a>	<a href="#">vl</a>	<a href="#">lc</a>





## Application-specific directional control valves

Type	 Control block VOFA	 Solenoid valve VOFD	 Solenoid valve VOFC	 Solenoid valve VOVG
<b>Design</b>	Piston spool valve	Directly actuated poppet valve	Soft-switching spool valve, piloted piston poppet valve	Piston spool valve
<b>Valve function</b>	3/2-way, closed, single solenoid, 5/2-way, single solenoid	3/2-way, closed, single solenoid	3/2-way, closed, single solenoid, 5/2-way, double-solenoid, 5/2-way, single solenoid	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 5/2-way, single solenoid
<b>Operating pressure</b>	3 ... 10 bar	0 ... 10 bar	2 ... 8 bar	-0.9 ... 8 bar
<b>Ambient temperature</b>	-5 ... 50 °C	-10 ... 60 °C	-25 ... 60 °C	-5 ... 50 °C
<b>Pneumatic connection 1</b>	G1/4	G1/4, connection pattern as per NAMUR	G1/2, G1/4, NPT1/4-18, connection pattern as per NAMUR	Connecting plate, M5, M7
<b>Nominal flow rate</b>	950 ... 1050 l/min	450l/min	600 ... 3000 l/min	180 ... 200 l/min
<b>Description</b>	<ul style="list-style-type: none"> <li>• Can be used as a press safety valve for safe reversing of a hazardous movement</li> <li>• Can be selected as a decentralised individual connection variant with electrical and pneumatic individual connection or as a feature integrated in the valve terminal VTSA/VTSA-F</li> <li>• Sturdy and durable metal design</li> <li>• Designed as a purely mechanical solution with regard to safety</li> </ul>	<ul style="list-style-type: none"> <li>• For outdoor use under harsh ambient conditions, e.g. in refineries thanks to sturdy design and high corrosion resistance</li> <li>• Ideally suited for process automation, for use in chemical and petrochemical plants</li> <li>• Especially suitable for quarter turn actuators thanks to flange pattern to NAMUR</li> <li>• Variants with TÜV approval up to SIL3 to IEC 61508</li> </ul>	<ul style="list-style-type: none"> <li>• For outdoor use under harsh ambient conditions, e.g. in refineries thanks to sturdy design and high corrosion resistance</li> <li>• Ideally suited for process automation, for use in chemical and petrochemical plants</li> <li>• Variants with TÜV approval up to SIL3 to IEC 61508</li> <li>• Shuttle valve can switch between internal and external pilot air</li> <li>• Especially suitable for quarter turn actuators thanks to flange pattern to NAMUR</li> </ul>	<ul style="list-style-type: none"> <li>• For compact handling tasks or for solutions with extremely high component density</li> <li>• Suitable for applications in the electronics and light assembly industry</li> <li>• In-line valve</li> <li>• Semi in-line valve</li> <li>• Connecting plate valve</li> <li>• Direct mounting, manifold assembly</li> <li>• Manifold rail for 2 ... 10 valves</li> <li>• Width 10, 12, 25 mm</li> <li>• Operating voltage 5, 12 or 24 V DC</li> </ul>
<b>online:</b> →	<a href="#">vofa</a>	<a href="#">vofd</a>	<a href="#">vofc</a>	<a href="#">vovg</a>



## Application-specific directional control valves

				
Type	Solenoid valve MHA1, MHP1	Solenoid valve MHE2, MHP2, MHA2, MHE3, MHP3, MHA3, MHE4, MHP4, MHA4	Solenoid valve CDVI5.0	Solenoid valve MHJ9, MHJ10
Design	Poppet valve with spring return	Pressure-relieved poppet valve	Piston spool valve	Poppet valve without spring return
Valve function	2/2-way, closed, single solenoid, 2x2/2-way, closed, single solenoid, 3/2-way, closed, single solenoid, 3/2-way, open, single solenoid	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 5/2-way, single solenoid	2/2-way, closed, single solenoid, 2/2-way, open, single solenoid, 2x3/2-way, closed, single solenoid, 2x3/2-way, open, single solenoid, 3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 5/2-way, double-solenoid, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	2/2-way, closed, single solenoid
Operating pressure	-0.9 ... 8 bar	-0.9 ... 8 bar	-0.9 ... +10 bar	0.5 ... 8 bar
Ambient temperature	-5 ... 50 °C	-5 ... 60 °C	-5 ... 50 °C	-5 ... 60 °C
Pneumatic connection 1	Connecting plate, QS-3, QS-4, prepared for QSP10	Connecting plate, M7, G1/8, G1/4, QS-4, QS-6, QS-8	Connecting plate	Connecting plate, QS-4, QS-6
Nominal flow rate	10 ... 30 l/min	90 ... 400 l/min	300 ... 650 l/min	50 ... 160 l/min
Description	<ul style="list-style-type: none"> <li>• Semi in-line valve</li> <li>• Connecting plate valve</li> <li>• Miniature valve: grid dimension 10 mm</li> <li>• Connecting plates</li> <li>• Manifold block for 2 ... 10 valves</li> <li>• Switching times down to 4 ms</li> <li>• Operating voltage 5, 12 or 24 V DC</li> </ul>	<ul style="list-style-type: none"> <li>• In-line valve</li> <li>• Semi in-line valve</li> <li>• Connecting plate valve</li> <li>• Fast-switching valve: switching times down to 2 ms</li> <li>• Direct mounting, individual connecting plate, manifold assembly</li> <li>• Manifold block for 2 ... 10 valves</li> <li>• Grid dimension 14, 19, 24 mm</li> <li>• Operating voltage: 24 V DC</li> </ul>	<ul style="list-style-type: none"> <li>• Connecting plate valve</li> <li>• Corrosion resistant</li> <li>• Easy-to-clean design</li> <li>• Also available as valve terminal CDVI</li> <li>• Operating voltage: 24 V DC</li> </ul>	<ul style="list-style-type: none"> <li>• Connecting plate valve</li> <li>• Individual valve with integrated QS fitting</li> <li>• For very fast sorting applications with up to 1000 Hz</li> <li>• Very long service life &gt; 2 billion switching cycles</li> <li>• Excellent repetition accuracy</li> </ul>
online: →	<a href="#">mh1</a>	<a href="#">mh2</a>	<a href="#">cdvi5.0</a>	<a href="#">mhj9</a>





## Application-specific directional control valves

		
Type	<b>Pneumatic and solenoid valve, M5 Compact System</b> J, JD, JMFH, MFH, MUFH, VD, VL/O, VL	<b>Valves for pneumatic feed unit BV</b> MLC-8, VL-8
Design	Piston spool valve, poppet seat	Piston spool valve, poppet seat
Valve function	3/2-way, double-solenoid, 3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 5/2-way, double-solenoid, 5/2-way, double-solenoid dominant signal, 5/2-way, single solenoid, 8/2-way, single solenoid	5/2-way, single solenoid, 8/2-way, single solenoid
Operating pressure	-0.9 ... +10 bar	1.5 ... 10 bar
Ambient temperature	-10 ... +60 °C	-10 ... 60 °C
Pneumatic connection 1	G3/8, PK-3	G3/8, PK-3
Nominal flow rate	50 ... 1800 l/min	105 ... 1800 l/min
Description	<ul style="list-style-type: none"> <li>• Complete system offering control components with all the functions required for pneumatic sequence controls</li> <li>• For control cabinet installation</li> <li>• Fast replacement of components</li> </ul>	<ul style="list-style-type: none"> <li>• For controlling feed motion and alternate voltage for pneumatic feed units</li> </ul>
online: →	<a href="#">m5-compact</a>	<a href="#">mlc</a>

## Manually actuated directional control valves: Swivel lever valves



		
Type	<b>Hand lever valve</b> VHER	<b>Hand lever valve</b> H-3-1/4-B, H-5-1/4-B
Valve function	4/3-way, exhausted, 4/3-way, closed	3/2-way, double-solenoid, 5/2-way, double-solenoid
Type of piloting	Direct	Direct, piloted
Nominal flow rate	170 ... 4300 l/min	550 ... 600 l/min
Pneumatic working port	G1/2, G1/4, G1/8, M5	G1/4
Operating pressure	-0.95 ... +10 bar	-0.95 ... +10 bar
Description	<ul style="list-style-type: none"> <li>• With lever and detent</li> <li>• Lever in metal or polymer design</li> <li>• Front panel mounting, through or mounting holes</li> <li>• Can also be used as 3/3-way valve by sealing port 2</li> </ul>	<ul style="list-style-type: none"> <li>• With hand lever</li> <li>• Die-cast aluminium design</li> </ul>
online: →	<a href="#">vher</a>	<a href="#">n_v14</a>

## Manually actuated directional control valves: Pushbutton valves





				
Type	Finger lever valve VHEM-P	Finger lever valve K/O-3-PK	Finger lever valve K-3-M5	Finger lever valve T-5/3-1/4
Valve function	5/2-way, double-solenoid, 5/2-way, single solenoid, 3/2-way, double-solenoid, 3/2-way, closed, single solenoid, 3/2-way, open, single solenoid	3/2-way, single solenoid, open/closed	3/2-way, closed, single solenoid	5/3-way, closed
Type of piloting	Direct, piloted	Direct	Direct	piloted
Nominal flow rate	500 l/min, 1000 l/min	80l/min	80l/min	680 l/min
Pneumatic working port	G1/8, G1/4	PK-3	M5	G1/4
Operating pressure	-0.95 ... 10 bar	0 ... 8 bar	-0.95 ... 8 bar	2 ... 10 bar
Description	<ul style="list-style-type: none"> <li>• With button switch</li> <li>• Reverse operation possible</li> <li>• Fast to assemble</li> </ul>	<ul style="list-style-type: none"> <li>• With button switch</li> <li>• Polymer design</li> <li>• Ducted exhaust air</li> </ul>	<ul style="list-style-type: none"> <li>• With button switch</li> <li>• Suitable for vacuum operation</li> <li>• Sturdy die-cast zinc design</li> </ul>	<ul style="list-style-type: none"> <li>• With pushbutton</li> <li>• For positioning, for stopping in the event of an emergency stop and for holding a double-acting cylinder in any position</li> <li>• Aluminium design</li> </ul>
online: →	<a href="#">vhem-p</a>	<a href="#">n_vpk</a>	<a href="#">k-3</a>	<a href="#">n_msv</a>

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## Manually actuated directional control valves: Pushbutton valves

		
Type	Heavy-duty palm button valve PV-3-1/8	Finger lever valve F-3-M5
Valve function	3/2-way, closed, single solenoid	3/2-way, closed, single solenoid
Type of piloting	Direct	Direct
Nominal flow rate	80l/min	80 l/min
Pneumatic working port	G1/8	M5
Operating pressure	-0.95 ... +8 bar	-0.95 ... +10 bar
Description	<ul style="list-style-type: none"> <li>• With large actuating surface</li> <li>• For heavy duty actuation</li> <li>• Suitable for vacuum operation</li> </ul>	<ul style="list-style-type: none"> <li>• With pedal</li> <li>• Suitable for vacuum operation</li> <li>• Sturdy die-cast zinc design</li> </ul>
online: →	<a href="#">pv-3</a>	<a href="#">f-3-m5</a>



## Manually actuated directional control valves: Finger lever valves

				
Type	Finger lever valve VHEM-L, VHEM-LT	Finger lever valve TH/O-3-PK-3	Finger lever valve TH-3-M5, TH-3-1/4-B, TH-5-1/4-B, THO-3-1/4-B	Finger lever valve H-4/3
Valve function	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 5/2-way, single solenoid	3/2-way, closed, single solenoid	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 5/2-way, single solenoid	4/3-way, exhausted, 5/3-way, closed
Type of piloting	Direct	Direct	Direct	piloted
Nominal flow rate	500 l/min, 1000 l/min	80 l/min	80 ... 600 l/min	125 l/min
Pneumatic working port	G1/8, G1/4	PK-3	G1/4, M5	M5
Operating pressure	-0.95 ... +10 bar	0 ... 8 bar	-0.95 ... +10 bar	0 ... 8 bar
Description	<ul style="list-style-type: none"> <li>• With finger lever</li> <li>• Mechanical spring return</li> <li>• Fast to assemble</li> </ul>	<ul style="list-style-type: none"> <li>• With finger lever</li> <li>• Polymer design</li> <li>• Ducted exhaust air</li> </ul>	<ul style="list-style-type: none"> <li>• With finger lever</li> <li>• Die-cast zinc or die-cast aluminium design</li> </ul>	<ul style="list-style-type: none"> <li>• With detenting finger lever</li> <li>• Front panel mounting or mounting on connecting plate</li> <li>• Aluminium design</li> </ul>
online: →	<a href="#">vhem-l</a>	<a href="#">n_vpk</a>	<a href="#">th-3-m5</a>	<a href="#">h-4</a>


## Manually actuated directional control valves: Toggle lever valves

		
Type	Toggle lever valve KH/O-3-PK-3	Toggle lever valve H-5/3-1/4
Valve function	3/2-way, single solenoid, open/closed	5/3-way, closed
Type of piloting	Direct	piloted
Nominal flow rate	80l/min	680 l/min
Pneumatic working port	PK-3	G1/4
Operating pressure	0 ... 8 bar	2 ... 10 bar
Description	<ul style="list-style-type: none"> <li>• With toggle lever</li> <li>• Polymer design</li> <li>• Ducted exhaust air</li> </ul>	<ul style="list-style-type: none"> <li>• With toggle lever</li> <li>• For positioning, for stopping in the event of an emergency stop and for holding a double-acting cylinder in any position</li> <li>• Aluminium design</li> </ul>
online: →	<a href="#">n_vpk</a>	<a href="#">n_msv</a>




## Manually actuated directional control valves: Foot valves

		
Type	<b>Foot valve</b> F-3-1/4-B, FO-3-1/4-B, F-5-1/4-B	<b>Foot valve with detent</b> FP-3-1/4-B, FPB-3-1/4, FP-5-1/4-B
Valve function	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 5/2-way, single solenoid	3/2-way, closed, single solenoid, 5/2-way, single solenoid
Type of piloting	Direct	Direct
Nominal flow rate	550 ... 600 l/min	550 ... 600 l/min
Pneumatic working port	G1/4	G1/4
Operating pressure	-0.95 ... +10 bar	-0.95 ... +10 bar
Description	<ul style="list-style-type: none"> <li>• With foot pedal</li> <li>• Sturdy die-cast zinc design</li> </ul>	<ul style="list-style-type: none"> <li>• With foot pedal with detent</li> <li>• Sturdy die-cast zinc design</li> </ul>
online: →	<a href="#">fo-3</a>	<a href="#">fpb-3</a>





## Manually actuated directional control valves: Selector switches

	
Type	<b>Selector switch</b> HW-6-38
Valve function	8/6-way, double-solenoid
Type of piloting	Direct
Nominal flow rate	180 l/min
Pneumatic working port	M5
Operating pressure	0 ... 8 bar
Description	<ul style="list-style-type: none"> <li>• With rotary knob and arrow</li> <li>• Front panel mounting or mounting on connecting plate</li> <li>• With six switching positions</li> </ul>
online: →	<a href="#">hw-6</a>




## Manually actuated directional control valves: Front panel valves

			
Type	Front panel valve SV/O-3-PK-3x2	Front panel valve SVS-3-1/8, SVS-4-1/8, SVSO-3-1/8	Front panel valve SV-3-M5, SV-5-M5-B
Valve function	2x3/2-way, closed, single solenoid	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 4/2-way, single solenoid	3/2-way, closed, single solenoid, 5/2-way, single solenoid
Type of piloting	Direct	Direct	Direct
Nominal flow rate	70l/min	120l/min	65 ... 95 l/min
Pneumatic working port	PK-3	G1/8	M5
Operating pressure	0 ... 8 bar	3.5 ... 8 bar	-0.95 ... 8 bar
Description	<ul style="list-style-type: none"> <li>Basic valve for actuator attachments such as toggle levers, selector switches</li> <li>Polymer design</li> <li>Reliable coupling system for rapid assembly and dismantling</li> </ul>	<ul style="list-style-type: none"> <li>Basic valve for actuator attachments such as pushbutton actuators, mushroom pushbuttons, mushroom actuators, selector switches, toggle levers, key actuators</li> <li>Reliable coupling system for rapid assembly and dismantling</li> <li>front panel mounting</li> </ul>	<ul style="list-style-type: none"> <li>Basic valve for actuator attachments such as pushbutton actuators, mushroom pushbuttons, mushroom pushbuttons with detent, selector switches, toggle levers</li> <li>front panel mounting</li> <li>Plastic design</li> <li>Reliable coupling system for rapid assembly and dismantling</li> </ul>
online: →	<a href="#">sv</a>	<a href="#">svos</a>	<a href="#">sv-3</a>




## Mechanically actuated directional control valves: Stem actuated valves

				
Type	Stem actuated valve VMEM	Stem actuated valve V/O-3-PK-3, V/O-3-1/8	Stem actuated micro valve S-3-PK-3-B, SO-3-PK-3-B	Stem actuated valve VS-3-1/8, VS-4-1/8, VOS-3-1/8
Valve function	3/2-way, single solenoid, open/closed, 5/2-way, single solenoid	3/2-way, single solenoid, open/closed	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 4/2-way, single solenoid
Type of piloting	Direct, piloted	Direct	Direct	piloted
Nominal flow rate	500 l/min, 1000 l/min	80 ... 140 l/min	60l/min	120l/min
Pneumatic working port	G1/8, G1/4	G1/8, PK-3	PK-3	G1/8
Operating pressure	-0.95 ... +10 bar	-0.95 ... +8 bar	-0.95 ... +8 bar	3.5 ... 8 bar
Description	<ul style="list-style-type: none"> <li>Outstanding pneumatic performance for a wide range of applications</li> <li>Light weight</li> <li>Small size</li> <li>Design: VMEM-S: stem actuated valve, VMEM-B: ball actuated valve, VMEM-D: roller actuated valve</li> </ul>	<ul style="list-style-type: none"> <li>With plunger or actuator attachments as required</li> <li>Through-holes in housing</li> <li>Polymer or aluminium design</li> </ul>	<ul style="list-style-type: none"> <li>With plunger for actuator attachments such as pushbutton actuators, toggle levers</li> <li>Dimensions to DIN 41635, type A</li> <li>Polymer design</li> </ul>	<ul style="list-style-type: none"> <li>With plunger</li> <li>Aluminium design</li> <li>Minimal actuating force with pilot control</li> <li>Can also be used as 2/2-way valve by plugging the exhaust</li> </ul>
online: →	<a href="#">vmem</a>	<a href="#">n_v18</a>	<a href="#">s-3-pk</a>	<a href="#">vos</a>

## Mechanically actuated directional control valves: Stem actuated valves




Type	 <b>Stem actuated valve</b> V-3-1/4-B, V-5-1/4-B, VO-3-1/4-B	 <b>Limit switch</b> SDK-3-PK-3, SDK-4-PK-3	 <b>Limit stop signal generator</b> SDV-2-B, SDV-3
<b>Valve function</b>	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 5/2-way, single solenoid	3/2-way, closed, single solenoid	3/2-way, closed, single solenoid
<b>Type of piloting</b>	Direct	Direct	Direct
<b>Nominal flow rate</b>	550 ... 600 l/min	16 l/min	16 l/min
<b>Pneumatic working port</b>	G1/4	PK-3	PK-3
<b>Operating pressure</b>	-0.95 ... +10 bar	0 ... 8 bar	0 ... 8 bar
<b>Description</b>	<ul style="list-style-type: none"> <li>• With plunger</li> <li>• Die-cast aluminium design</li> </ul>	<ul style="list-style-type: none"> <li>• Can be used for stroke-dependent signal generation as a limit switch and fixed stop</li> <li>• For end-position sensing and position control</li> <li>• High accuracy</li> <li>• Stainless steel design</li> </ul>	<ul style="list-style-type: none"> <li>• Can be used for stroke-dependent signal generation as a limit switch and fixed stop</li> <li>• For end-position sensing and position control</li> <li>• High precision and low actuating forces</li> <li>• Compact dimensions</li> <li>• Use in contaminated environments</li> </ul>
<b>online: →</b>	<a href="#">vo-3</a>	<a href="#">sdk</a>	<a href="#">sdv</a>

## Mechanically actuated directional control valves: Roller lever valves




Type	 <b>Roller lever valve</b> R/O-3-PK-3	 <b>Roller lever valve</b> RS-3-1/8, RS-4-1/8, ROS-3-1/8	 <b>Roller lever valve</b> R-3-M5, R-3-1/4-B, R-5-1/4-B, RO-3-1/4-B
<b>Valve function</b>	3/2-way, single solenoid, open/closed	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 4/2-way, single solenoid	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 5/2-way, single solenoid
<b>Type of piloting</b>	Direct	piloted	Direct
<b>Nominal flow rate</b>	80 l/min	120 l/min	80 ... 600 l/min
<b>Pneumatic working port</b>	PK-3	G1/8	G1/4, M5
<b>Operating pressure</b>	0 ... 8 bar	3.5 ... 8 bar	-0.95 ... +10 bar
<b>Description</b>	<ul style="list-style-type: none"> <li>• With roller lever</li> <li>• Polymer design</li> <li>• Ducted exhaust air</li> </ul>	<ul style="list-style-type: none"> <li>• With roller lever</li> <li>• Aluminium design</li> <li>• Minimal actuating force with pilot control</li> <li>• Can also be used as 2/2-way valve by plugging the exhaust</li> </ul>	<ul style="list-style-type: none"> <li>• With roller lever</li> <li>• Die-cast aluminium design</li> </ul>
<b>online: →</b>	<a href="#">n_vpk</a>	<a href="#">ros-3</a>	<a href="#">ro-3</a>




## Mechanically actuated directional control valves: Roller lever valves with idle return

			
Type	Roller lever valve with idle return L/O-3-PK-3	Roller lever valve with idle return LS-3-1/8, LS-4-1/8, LOS-3-1/8	Roller lever valve with idle return L-3-M5, L-3-1/4-B, L-4-1/4-B, LO-3-1/4-B
Valve function	3/2-way, single solenoid, open/closed	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 4/2-way, single solenoid	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 5/2-way, single solenoid
Type of piloting	Direct	piloted	Direct
Nominal flow rate	80l/min	120l/min	80 ... 600 l/min
Pneumatic working port	PK-3	G1/8	G1/4, M5
Operating pressure	0 ... 8 bar	3.5 ... 8 bar	-0.95 ... +10 bar
Description	<ul style="list-style-type: none"> <li>• With roller lever with idle return</li> <li>• Polymer design</li> <li>• Ducted exhaust air</li> </ul>	<ul style="list-style-type: none"> <li>• With toggle lever</li> <li>• Aluminium design</li> <li>• Minimal actuating force with pilot control</li> <li>• Can also be used as 2/2-way valve by plugging the exhaust</li> </ul>	<ul style="list-style-type: none"> <li>• With roller lever</li> <li>• Die-cast aluminium design</li> </ul>
online: →	<a href="#">n_vpk</a>	<a href="#">los-3</a>	<a href="#">lo-3</a>





## Mechanically actuated directional control valves: Swivel lever valves

			
Type	Swivel lever valve RW/O-3-1/8	Pneumatic limit valve RWN/O-3-1/8-B	Swivel lever valve RW-3-M5
Valve function	3/2-way, single solenoid, open/closed	3/2-way, single solenoid, open/closed	3/2-way, closed, single solenoid
Type of piloting	Direct	Direct	Direct
Nominal flow rate	140 l/min	120 l/min	80l/min
Pneumatic working port	G1/8	G1/8	M5
Operating pressure	-0.95 ... +8 bar	-0.95 ... +8 bar	-0.95 ... +8 bar
Description	<ul style="list-style-type: none"> <li>• Basic valve for actuator attachments such as swivel lever short, long, swivel lever rod</li> <li>• Aluminium design</li> </ul>	<ul style="list-style-type: none"> <li>• Directly actuated in one direction</li> <li>• Aluminium design</li> </ul>	<ul style="list-style-type: none"> <li>• With swivel lever</li> <li>• Additional actuator attachments such as swivel lever short, long, swivel lever rod</li> <li>• Sturdy die-cast zinc design</li> </ul>
online: →	<a href="#">rw</a>	<a href="#">rwn</a>	<a href="#">rw-3</a>



## Mechanically actuated directional control valves: Whisker valves

	
Type	Whisker valve FVS-3-1/8, FVSO-3-1/8
Valve function	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid
Type of piloting	piloted
Nominal flow rate	120l/min
Pneumatic working port	G1/8
Operating pressure	3.5 ... 8 bar
Description	<ul style="list-style-type: none"> <li>• With whisker</li> <li>• Especially suitable for sensing dissimilar workpieces or workpieces not precisely in position</li> <li>• Aluminium design</li> <li>• Minimal actuating force with pilot control</li> <li>• Can also be used as 2/2-way valve by plugging the exhaust</li> </ul>
online: →	<a href="#">fvs-3</a>





## Non-return valves and quick exhaust valves

				
Type	Piloted non-return valve VBNF	Quick exhaust valve VBQF	non-return valve H, HA, HB	Piloted non-return valve HGL
Pneumatic connection 1	QS-6, QS-8	G1/8, G1/4, QS-6, QS-8	G1/8, G1/4, G3/8, G1/2, G3/4, M5, QS-4, QS-6, QS-8, QS-10, QS-12, R1/8, R1/4, R3/8, R1/2	G1/8, G1/4, G3/8, G1/2, M5, QS-4, QS-6, QS-8, QS-10, QS-12
Nominal flow rate			115 ... 2230 l/min	
Standard flow rate exhaust 6→0 bar		1300 ... 2500 l/min		
Standard nominal flow rate pressurisation 6→5 bar		350 ... 960 l/min		
Standard nominal flow rate 1→2 (6-5)	260 ... 620 l/min		1000 ... 5900 l/min	130 ... 1600 l/min
Operating pressure	0.2 ... 10 bar	0.5 ... 10 bar	-1 ... 12 bar	0.5 ... 10 bar
Description	<ul style="list-style-type: none"> <li>• Minimal height</li> <li>• High flow rate</li> <li>• Can be rotated horizontally through 360° in assembled state</li> </ul>	<ul style="list-style-type: none"> <li>• Minimal height</li> <li>• High flow rate</li> <li>• Improved noise emissions</li> <li>• Available with or without silencer</li> <li>• Available with ducted and unducted exhaust air</li> </ul>	<ul style="list-style-type: none"> <li>• Valve function: non-return function</li> <li>• Screw-in or in-line installation</li> <li>• With connecting thread at both ends, push-in connector at both ends, threaded/push-in connector</li> </ul>	<ul style="list-style-type: none"> <li>• Valve function: delockable non-return function</li> <li>• Pneumatically piloted</li> <li>• Screw-in with male thread</li> <li>• Pilot air connection: M5, G1/8, G1/4, G3/8, QS-4</li> </ul>
online: →	<a href="#">vbnf</a>	<a href="#">vbqf</a>	<a href="#">h-qs</a>	<a href="#">hgl</a>

## Non-return valves and quick exhaust valves





Type	 Manual override HAB	 Quick exhaust valve SE, SEU
<b>Pneumatic connection 1</b>	G1/8, G1/4, G3/8, G1/2	G1/8, G1/4, G3/8, G1/2, G3/4
<b>Nominal flow rate</b>		
<b>Standard flow rate exhaust 6-&gt;0 bar</b>	165l/min	1000 ... 6500 l/min
<b>Standard nominal flow rate pressurisation 6-&gt;5 bar</b>		300 ... 4560 l/min
<b>Standard nominal flow rate 1-&gt;2 (6-5)</b>		
<b>Operating pressure</b>	0 ... 10 bar	0.2 ... 10 bar
<b>Description</b>	<ul style="list-style-type: none"> <li>Valve function: exhaust component</li> <li>For non-return valve HGL</li> <li>For manual exhausting of air trapped in a cylinder</li> </ul>	<ul style="list-style-type: none"> <li>Valve function: quick exhaust</li> <li>Shut-off valve, piloted</li> <li>Screw-in</li> <li>With or without silencer</li> </ul>
<b>online:</b> →	<a href="#">hab</a>	<a href="#">se</a>

## Ball valves and shut-off valves



Type	 Hand slide valve VBOH	 Shut-off valve HE	 Hand slide valve W	 Ball valve QH, QHS
<b>Valve function</b>		2/2-way, double solenoid, 3/2-way, double-solenoid	3/2-way, double-solenoid	2/2-way, double solenoid
<b>Pneumatic connection 1</b>	G1/8, G1/4, G1/2, G3/8, G3/4, M5	QS-6, QS-8, QS-10, QS-12, R1/8, R1/4, R3/8, R1/2	G1/8, G1/4, G3/8, G1/2, G3/4, M5	G1/4, G3/8, G1/2, G3/4, G1, G1 1/2, QS-4, QS-6, R1/8
<b>Nominal flow rate</b>	236 ... 7691 l/min	270 ... 840 l/min	120 ... 6800 l/min	148 ... 84000 l/min
<b>Operating pressure</b>	-0.95 ... +12 bar	-0.95 ... +10 bar	-0.95 ... +10 bar	-1 ... +10 bar
<b>Description</b>	<ul style="list-style-type: none"> <li>Used as a shut-off function for pressurising and exhausting compressed air systems, for example, upstream of service unit combinations, for air guns and also for exhausting pneumatic cylinders</li> <li>Non-overlapping, so no pressure losses when switching</li> <li>Minimal installation</li> </ul>	<ul style="list-style-type: none"> <li>Shut-off valve, piloted</li> <li>Connection: thread at both ends, push-in connector at both ends, threaded/push-in connector</li> </ul>	<ul style="list-style-type: none"> <li>Shut-off valve, manually operated</li> <li>In-line installation in-line installation</li> <li>Metal design</li> </ul>	<ul style="list-style-type: none"> <li>Shut-off valve, manually operated</li> <li>In-line installation, screw-in, bulkhead fitting</li> <li>Variants: thread at both ends, push-in connector at both ends, threaded/push-in connector</li> </ul>
<b>online:</b> →	<a href="#">vboh</a>	<a href="#">he</a>	<a href="#">w-3</a>	<a href="#">qh</a>

## Logic valves





FESTO

				
Type	<b>OR gate</b> OS	<b>Amplifier module</b> VK	<b>NOT module</b> VLO	<b>AND module</b> ZK
Valve function	OR function			AND operation
Pneumatic connection 1	G1/2, G1/4, G1/8, PK-3, PK-4	PK-4, M5	PK-4, M5	G1/8, PK-3, PK-4
Nominal flow rate	100 ... 5000 l/min	80 l/min	80 l/min	100 ... 550 l/min
Operating pressure	0.001 ... 10 bar	0.1 ... 0.25 bar and 1 ... 7 bar	0.1 ... 0.25 bar and 1 ... 7 bar	0.001 ... 10 bar
Description	<ul style="list-style-type: none"> <li>Valve function: OR function</li> <li>Logic valve</li> <li>Pneumatic controller</li> <li>Mounting via through-holes</li> </ul>	<ul style="list-style-type: none"> <li>For pneumatic sensors</li> </ul>	<ul style="list-style-type: none"> <li>For pneumatic sensors</li> </ul>	<ul style="list-style-type: none"> <li>Valve function: AND function</li> <li>Dual-pressure valve</li> <li>Connects two input signals in the AND function</li> <li>Mounting via through-holes</li> </ul>
online: →	<a href="#">os</a>	<a href="#">vk</a>	<a href="#">vlo</a>	<a href="#">zk</a>


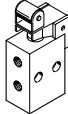


## Pressure regulators

		
Type	<b>Pressure regulator</b> LR-QS, LRMA-QS	<b>Differential pressure regulator</b> LRL, LRLl
Pressure regulation range	1 ... 8 bar	2 ... 6 bar
Nominal flow rate	22 ... 150 l/min	
Nominal flow rate, closed		30 ... 730 l/min
Nominal flow rate, open		30 ... 760 l/min
Pneumatic connection 1	G1/8, G1/4, M5, QS-4, QS-6, QS-8	G1/8, G1/4, G3/8, G1/2, M5
Pneumatic connection 2	QS-4, QS-6, QS-8	QS-4, QS-6, QS-8, QS-10, QS-12
Description	<ul style="list-style-type: none"> <li>Piston regulator with through pressure supply</li> <li>Available with pressure gauge</li> <li>Directly actuated</li> <li>Connections: push-in connector at both ends, threaded/push-in connector</li> <li>Push-in connector, can be rotated 360°</li> </ul>	<ul style="list-style-type: none"> <li>Piston regulator with through pressure supply</li> <li>Without pressure gauge</li> <li>Connections: threaded/push-in connector on top or at side</li> <li>Push-in connector, can be rotated 360°</li> </ul>
online: →	<a href="#">lrma</a>	<a href="#">lrl</a>





## One-way flow control valves

				
Type	One-way flow control valve VFOF	One-way flow control valve VFOC	One-way flow control valve GRLA, GRLZ, CRGRLA, GRGA, GRGZ, GRLSA	One-way flow control valve GRXA-HG
Valve function	Exhaust air one-way flow control function	supply air one-way flow control function	Exhaust air one-way flow control function, one-way flow control function, supply air one-way flow control function	Exhaust air one-way flow control function
Pneumatic connection 1	QS-6, QS-8	QS-4, QS-6	G1/8, G1/4, G1/2, G3/8, G3/4, M3, M5, PK-3, PK-3 with union nut, PK-4, PK-4 with union nut, PK-6 with union nut, QS-3, QS-4, QS-6, QS-8, QS-10, QS-12	QS-4, QS-6, QS-8
Standard nominal flow rate in direction of flow control	250 ... 650 l/min	0 ... 270 l/min	0 ... 4320 l/min	130 ... 280 l/min
Adjusting element	Internal hex	slotted head screw	Knurled screw, slotted head screw	slotted head screw
Description	<ul style="list-style-type: none"> <li>Minimal height</li> <li>High flow rate</li> <li>Can be rotated horizontally through 360° in assembled state</li> <li>Functional combination with one-way flow control valve and piloted non-return valve</li> </ul>	<ul style="list-style-type: none"> <li>Shut-off valve, flow control at one end</li> <li>Metal design</li> <li>Precision adjustment for low and medium speeds</li> <li>Push-in connector/push-in sleeve</li> </ul>	<ul style="list-style-type: none"> <li>Flow control valve, flow control at one end</li> <li>Standard, mini, in-line variants with different flow rates</li> <li>Functional combination with one-way flow control valve and piloted non-return valve</li> <li>Polymer, metal or stainless steel design</li> <li>Connections: thread at both ends, push-in connector at both ends, threaded/push-in connector</li> </ul>	<ul style="list-style-type: none"> <li>Functional combination with one-way flow control valve and piloted non-return valve</li> <li>Holding function and speed setting in one housing</li> <li>Additional supply port for holding crossover interlinking</li> </ul>
online: →	<a href="#">vfof</a>	<a href="#">vfof</a>	<a href="#">grta</a>	<a href="#">grxa-hg</a>

## One-way flow control valves


				
Type	One-way flow control valve GR, GRA	One-way flow control valve GG, GGO, GRR	Precision one-way flow control valve GRP	One-way flow control valve, M5 Compact System GRF
Valve function	one-way flow control function	one-way flow control function	one-way flow control function	one-way flow control function
Pneumatic connection 1	G1/2, G1/4, G1/8, G3/4, G3/8, M3, M5, QS-3, QS-4, QS-6, QS-8	G1/2, G1/4	G1/8, PK-3, PK-4	PK-3
Standard nominal flow rate in direction of flow control	25 ... 3300 l/min	870 ... 1300 l/min	3.8 ... 75.8 l/min	45 l/min
Adjusting element	Knurled screw	Roller lever	Rotary knob with scale	Knurled screw
Description	<ul style="list-style-type: none"> <li>Non-return and flow control valve</li> <li>In-line installation in-line installation</li> </ul>	<ul style="list-style-type: none"> <li>Non-return and flow control valves</li> <li>With roller lever</li> </ul>	<ul style="list-style-type: none"> <li>Non-return and flow control valve</li> <li>Mounting on connecting plate or for front panel mounting</li> </ul>	<ul style="list-style-type: none"> <li>Complete system offering control components with all the functions required for pneumatic sequence controls</li> <li>For control cabinet installation</li> <li>Fast replacement of components</li> </ul>
online: →	<a href="#">gr</a>	<a href="#">gg</a>	<a href="#">grp</a>	<a href="#">m5-compact</a>

## Flow control valves



Type	 Flow control/silencer VFFK	 Flow control valve GRLO, GRGO	 Flow control valve, barbed Y-connector with restrictor GRO, Y	 Precision flow control valve GRPO
Valve function	Flow control/silencer function	Flow control function	Flow control function	Flow control function
Pneumatic connection 1	M5, M7, R1/8, R1/4	M3, M5	G1/4, G1/8, M5, QS-3, QS-4, QS-6	G1/8, PK-3, PK-4
Standard flow rate in direction of flow control 6->0 bar	0 ... 420 l/min	33 ... 169 l/min	25 ... 350 l/min	5.2 ... 129 l/min
Adjusting element	Knurled screw	slotted head screw	Knurled screw	Rotary knob with scale
Description	<ul style="list-style-type: none"> <li>With polymer silencer</li> </ul>	<ul style="list-style-type: none"> <li>Flow control valve, flow control at both ends</li> <li>Standard or mini flow control valve</li> <li>Metal design</li> <li>Precision adjustment for low and medium speeds</li> <li>Connections: threaded at both ends, threaded/push-in connector</li> <li>Connections: elbow outlet or parallel outlet</li> </ul>	<ul style="list-style-type: none"> <li>Flow control valve, flow control at both ends</li> <li>In-line flow control valve</li> <li>Polymer design</li> <li>Connections: push-in connector at both ends</li> <li>Connections: in-line, Y-shape</li> </ul>	<ul style="list-style-type: none"> <li>Metal design</li> <li>Connections: threaded connection at both ends, push-in connector at both ends</li> </ul>
online: →	<a href="#">vffk</a>	<a href="#">grlo</a>	<a href="#">gro</a>	<a href="#">grpo</a>

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## Flow control valves

Type	 Exhaust air flow control valve, flow control/silencer GRE, GRU
Valve function	Flow control/silencer function
Pneumatic connection 1	G1/8, G1/4, G1/2, G3/8, G3/4
Standard flow rate in direction of flow control 6->0 bar	0 ... 8000 l/min
Adjusting element	slotted head screw
Description	<ul style="list-style-type: none"> <li>Exhaust air flow control valve GRE: sintered metal</li> <li>Flow control/silencer GRU: polymer</li> </ul>
online: →	<a href="#">gre</a>




## Time delay valves

Type	 Time delay valve VZO, VZ, VLK	 Time delay valve VZA, VZOA, VZB, VZOB
Pneumatic connection	PK-3	G1/4
Nominal flow rate	60 ... 90 l/min	600 l/min
Adjustable delay time	0.25 ... 5 s	0 ... 30 s
Operating pressure	2.5 ... 8 bar	0 ... 10 bar
Type of mounting	Optional: front panel mounting, on mounting frame	Optional: 2 through-holes in housing, front panel mounting
Description	<ul style="list-style-type: none"> <li>Complete system offering control components with all the functions required for pneumatic sequence controls</li> <li>For control cabinet installation</li> <li>Fast replacement of components</li> </ul>	<ul style="list-style-type: none"> <li>Time delay infinitely adjustable</li> </ul>
online: →	<a href="#">m5-compact</a>	<a href="#">vza</a>

## Proportional valves





Type	 Proportional pressure regulator VPPX	 Proportional pressure regulator VPPM	 Proportional directional control valve VPWP	 Proportional pressure regulator MPPE
Valve function	3-way proportional pressure regulator	3-way proportional pressure regulator	5/3-way proportional directional control valve, closed	3-way proportional pressure regulator, closed
Pneumatic connection 1	Connecting plate, G1/8, G1/4, G1/2	Connecting plate, G1/8, G1/4, G1/2, NPT1/8-27, NPT1/4-18, NPT1/2-14	G1/4, G1/8, G3/8	G1/8, G1/4, G1/2
Pressure regulation range	0.1 ... 10 bar	0.02 ... 10 bar	0 ... 10 bar	0 ... 10 bar
Nominal flow rate	1400 ... 7000 l/min	380 ... 7000 l/min	350 ... 2000 l/min	350 ... 8800 l/min
Description	<ul style="list-style-type: none"> <li>Multi-sensor control (cascade control)</li> <li>Control characteristic adjustable via FCT</li> <li>Temperature compensated</li> <li>High dynamic response</li> <li>High repetition accuracy</li> <li>Individual valves (in-line valve) or connecting plate valves (manifold/flanged valve)</li> <li>Integrated pressure sensor with separate output</li> <li>Pressure is maintained if the controller fails</li> </ul>	<ul style="list-style-type: none"> <li>In-line valve</li> <li>Connecting plate valve, flanged valve</li> <li>Piloted diaphragm regulator</li> <li>Integration in valve terminal MPA via fieldbus</li> <li>Multi-sensor control</li> <li>High repetition accuracy</li> <li>User interface with LED displays, LCD display, adjustment/selection buttons</li> <li>Setpoint value input as analogue voltage or current signal</li> <li>Integrated pressure sensor</li> <li>Electrical connection via plug, round design, 8-pin, M12 or terminal linking</li> </ul>	<ul style="list-style-type: none"> <li>Controlled piston spool valve</li> <li>Digital actuation</li> <li>Integrated pressure sensors for monitoring function and force control</li> <li>With auto identification</li> <li>Diagnostic function</li> <li>Integrated digital output, e.g. for a clamping/brake unit</li> <li>Suitable for servopneumatic applications with CPX-CMAX and CPX-CMPX</li> </ul>	<ul style="list-style-type: none"> <li>Pilot actuated piston regulator</li> <li>Setpoint value input as analogue voltage or current signal</li> <li>Choice of pressure regulation ranges</li> <li>Electrical connection via plug, round design to DIN 45326, M16 x 0.75, 8-pin</li> <li>Available with setpoint module</li> <li>See product documentation on our website for standard nominal flow rate</li> </ul>
online: →	<a href="#">vppx</a>	<a href="#">vppm</a>	<a href="#">vpwp</a>	<a href="#">mppe</a>

## Proportional valves

			
Type	Proportional pressure regulator MPPES	Proportional pressure regulator VPPE	Proportional directional control valve MPYE
Valve function	3-way proportional pressure regulator, closed	3-way proportional pressure regulator, 3-way proportional pressure regulator, closed	5/3-way, closed
Pneumatic connection 1	G1/8, G1/4, G1/2	G1/8	G1/8, G1/4, G3/8, M5
Pressure regulation range	0 ... 10 bar	0.02 ... 10 bar	0 ... 10 bar
Nominal flow rate	230 ... 8500 l/min	310 ... 1250 l/min	100 ... 2000 l/min
Description	<ul style="list-style-type: none"> <li>• Directly actuated (G1/8), pilot actuated piston regulator (G1/4, G1/2)</li> <li>• Setpoint value input as analogue voltage or current signal</li> <li>• Choice of pressure regulation ranges, individual pressure regulation ranges on request</li> <li>• Electrical connection via plug, round design to DIN 45326, M16 x 0.75, 8-pin</li> <li>• Available with setpoint module</li> <li>• See product documentation on our website for standard nominal flow rate</li> </ul>	<ul style="list-style-type: none"> <li>• Piloted diaphragm regulator</li> <li>• Setpoint input as analogue voltage signal (0 ... 10 V)</li> <li>• Electrical connection via M12x1 plug, 4-pin</li> <li>• Available with setpoint module</li> </ul>	<ul style="list-style-type: none"> <li>• Controlled piston spool valve</li> <li>• Analogue actuation</li> <li>• Setpoint input as analogue voltage signal (0 ... 10 V)</li> <li>• Suitable for servopneumatic applications with SPC11</li> </ul>
online: →	<a href="#">mpps</a>	<a href="#">vppe</a>	<a href="#">mpye</a>



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## Solenoid-actuated process and media valves





				
Type	Solenoid valve VZWD	Reverse jet valve VZWE-E, VZWE-F	Solenoid valve VZWF	Solenoid valve VZWM
Design	Directly actuated poppet valve	Angled design, straight design with flange, diaphragm valve	diaphragm valve, force piloted	Poppet valve with diaphragm seal
Type of actuation	electrical	electrical	electrical	electrical
Nominal width	1 ... 6 mm	20 ... 76 mm	13.5 ... 50 mm	13 ... 50 mm
Process valve connection	G1/8, G1/4	G3/4, G1, G11/2, G2, G21/2, Flange diameter 60 mm, 75 mm, 89 mm	G1/4, G3/8, G1/2, G3/4, G1, G11/4, G11/2, G2	G1/4, G3/8, G1/2, G3/4, G1, G11/4, G11/2, G2
Flow rate Kv	0.06 ... 0.4 m³/h	15 ... 210 m³/h	1.8 ... 28 m³/h	1.6 ... 39 m³/h
Medium pressure	0 ... 90 bar	0.35 ... 8 bar	0 ... 10 bar	0.5 ... 10 bar
Temperature of medium	-10 ... 80 °C	-20 ... 60 °C	-10 ... 80 °C	-10 ... 60 °C
Description	<ul style="list-style-type: none"> <li>• For applications with high pressure ranges and low flow rates</li> <li>• No pressure difference required</li> <li>• Can also be used in vacuum technology</li> <li>• Operating voltage: 24 V DC; 110, 230 V AC</li> </ul>	<ul style="list-style-type: none"> <li>• For mechanically cleaning filters and dust filter systems</li> <li>• High flow rates</li> <li>• Fast opening and closing times</li> <li>• Sturdy pilot system</li> <li>• Operating voltage: 24 V DC; 110, 230 V AC</li> </ul>	<ul style="list-style-type: none"> <li>• High flow rates with large nominal sizes using relatively small solenoids</li> <li>• No pressure difference required</li> <li>• Can also be used in vacuum technology</li> <li>• Operating voltage: 24 V DC; 110, 230 V AC</li> </ul>	<ul style="list-style-type: none"> <li>• diaphragm valve</li> <li>• Servo controlled</li> <li>• Brass or stainless steel casting design</li> <li>• Wide range of coils</li> <li>• Electrical connection via solenoid armature tube system 8 or 13</li> <li>• Operating voltage: 24 V DC; 110, 230 V AC</li> <li>• Coil can be ordered separately</li> </ul>
online: →	<a href="#">vzwd</a>	<a href="#">vzwe</a>	<a href="#">vzwf</a>	<a href="#">vzwm</a>







## Solenoid-actuated process and media valves

Type	 <b>Solenoid valve VZWP</b>	 <b>Solenoid valve MN1H-2</b>
<b>Design</b>	piloted piston poppet valve	diaphragm valve
<b>Type of actuation</b>	electrical	electrical
<b>Nominal width</b>	13 ... 25 mm	13 ... 40 mm
<b>Process valve connection</b>	G1/4, G3/8, G1/2, G3/4, G1	G1/4, G3/8, G1/2, G3/4, G1, G11/2
<b>Flow rate Kv</b>	1.5 ... 11.5 m <sup>3</sup> /h	2000 ... 30500 l/min
<b>Medium pressure</b>	0.5 ... 40 bar	0.5 ... 10 bar
<b>Temperature of medium</b>	-10 ... 80 °C	-10 ... 60 °C
<b>Description</b>	<ul style="list-style-type: none"> <li>• For all applications with a differential pressure of min. 0.5 bar</li> <li>• For high pressures and high flow rates with relatively small solenoids</li> <li>• For controlling gaseous and liquid media in open circuits</li> <li>• Operating voltage: 24 V DC; 110, 230 V AC</li> </ul>	<ul style="list-style-type: none"> <li>• diaphragm valve</li> <li>• Piloted</li> <li>• Brass design</li> <li>• Can only be used for gaseous media</li> <li>• Adjustable closing cushioning, in-line mounting or through-hole</li> <li>• Operating voltage 24 V DC, 110/230 V AC</li> </ul>
<b>online:</b> →	<a href="#">vzwp</a>	<a href="#">mn1h-2</a>



## Pneumatically and mechanically actuated process and media valves

Type	 Disc valve VZFB	 Proportional media valve VZQA	 Angle seat valve VZXF	 Ball valve VZBC
<b>Design</b>	2-way disk valve	Pinch valve, pneumatically actuated	Poppet valve with spring return	2-way ball valve
<b>Type of actuation</b>	Manual	pneumatic	pneumatic	Mechanical
<b>Nominal width</b>	1" ... 4", DN 25 ... DN100	DN 6, 15	12 ... 45 mm	15, 20, 25, 32, 40, 50, 65, 80, 100
<b>Process valve connection</b>	Terminal/terminal, weld-on ends/weld-on ends, male thread/male thread	Clamp to DIN 32676, G1/4, G1/2	G1/2, G3/4, G1, G1 1/4, G1 1/2, G2	Ring housing with threaded flange
<b>Flow rate Kv</b>		1550 ... 12800 l/min	2.8 ... 47.5 m <sup>3</sup> /h	19.4 ... 1414 m <sup>3</sup> /h
<b>Medium pressure</b>		0 ... 4 bar	3 ... 40 bar	
<b>Temperature of medium</b>	-10 ... 140 °C	-5 ... 100 °C	-40 ... 200 °C	-10 ... 200 °C
<b>Description</b>	<ul style="list-style-type: none"> <li>• Medium: water, neutral liquids</li> <li>• Three variants based on standard ASME BPE, DIN11851, SMS 1145</li> </ul>	<ul style="list-style-type: none"> <li>• Modular design</li> <li>• Quick and easy replacement of the diaphragm</li> <li>• Selection of different materials for housing and connector caps</li> <li>• Different connection cap designs (G and NPT thread), clamp ferrule to DIN32676 and ASME-BPE</li> <li>• For critical, abrasive and viscous media</li> <li>• Tested service life of up to 2 million switching cycles</li> <li>• FDA-compliant materials</li> <li>• Easy-to-clean design</li> <li>• Safety position "opening"</li> <li>• Flow direction can be freely selected</li> <li>• Completely round passage</li> </ul>	<ul style="list-style-type: none"> <li>• Sturdy design</li> <li>• Stainless steel and gunmetal process valves with stainless steel, brass or aluminium drives</li> <li>• For medium pressures up to 40 bar</li> <li>• Safety position "closing"</li> <li>• Different drive sizes and housing materials</li> <li>• Selection of different seat and shaft seals</li> <li>• Choice of flow directions</li> <li>• For liquids, gases and other easily contaminated media</li> <li>• Easy-to-clean design</li> </ul>	<ul style="list-style-type: none"> <li>• Automatable 2-way ball valve with compact flange</li> <li>• Stainless steel design</li> <li>• Short installed length</li> <li>• Blow-out proof shaft</li> <li>• Manual operation possible using hand lever</li> <li>• Connecting thread to DIN 2999 or DIN ISO 228-1</li> <li>• Mounting flange to ISO 5211</li> <li>• ATEX certification for Zone 1, 21, 2, 22</li> </ul>
<b>online:</b> →	<a href="#">vzfb</a>	<a href="#">vzqa</a>	<a href="#">vzxf</a>	<a href="#">vzbc</a>





## Pneumatically and mechanically actuated process and media valves

Type	 Ball valve actuator unit VZBC	 Ball valve VAPB	 Ball valve VZBA	 Ball valve actuator unit VZBA
<b>Design</b>	2-way ball valve, Quarter turn actuator/quarter turn actuator	2-way ball valve	2-way ball valve, 3-way ball valve, L-hole, T-hole	2-way ball valve, 3-way ball valve, L-hole, Quarter turn actuator/quarter turn actuator, T-hole
<b>Type of actuation</b>	pneumatic	Mechanical	Mechanical	pneumatic
<b>Nominal width</b>	15, 20, 25, 32, 40, 50, 65, 80, 100	15, 20, 25, 32, 40, 50, 63	8, 10, 15, 20, 25, 32, 40, 50, 65, 80, 100	8, 10, 15, 20, 25, 32, 40, 50, 65, 80, 100
<b>Process valve connection</b>	Ring housing with threaded flange	Rp1/4, Rp3/8, Rp1/2, Rp3/4, Rp1, Rp1 1/4, Rp1 1/2, Rp2, Rp2 1/2	Rp1/4, Rp3/8, Rp1/2, Rp3/4, Rp1, Rp1 1/2, Rp1 1/4, Rp2, Rp2 1/2, Rp3, Rp4, weld-on ends/weld-on ends	Rp1/4, Rp3/8, Rp1/2, Rp3/4, Rp1, Rp1 1/4, Rp1 1/2, Rp2, Rp2 1/2, Rp3, Rp4, weld-on ends/weld-on ends
<b>Flow rate Kv</b>	19.4 ... 1414 m <sup>3</sup> /h	5.9 ... 535 m <sup>3</sup> /h	7 ... 1414 m <sup>3</sup> /h	7 ... 1414 m <sup>3</sup> /h
<b>Medium pressure</b>	6 ... 8.4 bar			6 ... 8.4 bar
<b>Temperature of medium</b>	-10 ... 200 °C	-10 ... 150 °C	-10 ... 200 °C	-10 ... 200 °C
<b>Description</b>	<ul style="list-style-type: none"> <li>Ball valve actuator unit with double-acting or single-acting quarter turn actuator</li> <li>Stainless steel ball valve in compact design</li> <li>Port pattern as per NAMUR for solenoid valves/sensor boxes to VDI/VDE 3845</li> <li>Flow is fully opened or closed in both directions</li> <li>ATEX certification for Zone 1, 21, 2, 22</li> </ul>	<ul style="list-style-type: none"> <li>Automatable 2-way ball valve</li> <li>Brass design</li> <li>Blow-out proof shaft</li> <li>Manual operation possible using hand lever</li> <li>Connecting thread to DIN 2999 or DIN ISO 228-1</li> <li>Mounting flange to ISO 5211</li> </ul>	<ul style="list-style-type: none"> <li>Automatable 2-way or 3-way ball valve</li> <li>Stainless steel design</li> <li>Blow-out proof shaft</li> <li>Manual operation possible using hand lever</li> <li>Connecting thread to DIN 2999 or DIN ISO 228-1</li> <li>Mounting flange to ISO 5211</li> <li>ATEX certification for Zone 1, 21, 2, 22</li> </ul>	<ul style="list-style-type: none"> <li>Ball valve actuator unit with double-acting or single-acting quarter turn actuator</li> <li>Stainless steel ball valve</li> <li>Port pattern as per NAMUR for solenoid valves/sensor boxes to VDI/VDE 3845</li> <li>Flow is fully opened or closed in both directions</li> <li>ATEX certification for Zone 1, 21, 2, 22</li> </ul>
<b>online:</b> →	<a href="#">vzbc</a>	<a href="#">vapb</a>	<a href="#">vzba</a>	<a href="#">vzba</a>


## Pneumatically and mechanically actuated process and media valves

		
Type	<b>Ball valve actuator unit VZPR</b>	<b>Pneumatic valve VLX</b>
Design	2-way ball valve, Quarter turn actuator	diaphragm valve
Type of actuation	pneumatic	pneumatic
Nominal width	15, 20, 25, 32, 40, 50, 63	13 ... 25 mm
Process valve connection	Rp1/4, Rp3/8, Rp1/2, Rp3/4, Rp1, Rp1 1/4, Rp1 1/2, Rp2, Rp2 1/2	G1/4, G3/8, G1/2, G3/4, G1
Flow rate Kv	5.9 ... 535 m <sup>3</sup> /h	2400 ... 14000 l/min
Medium pressure	1 ... 8.4 bar	1 ... 10 bar
Temperature of medium	-20 ... 150 °C	-10 ... 80 °C
Description	<ul style="list-style-type: none"> <li>• Ball valve actuator unit with double-acting quarter turn actuator</li> <li>• Brass ball valve</li> <li>• Port pattern as per NAMUR for solenoid valves/sensor boxes to VDI/VDE 3845</li> <li>• Flow is fully opened or closed in both directions</li> </ul>	<ul style="list-style-type: none"> <li>• Poppet valve</li> <li>• Indirectly actuated</li> <li>• Brass design</li> <li>• In-line mounting or via through-holes</li> </ul>
online: →	<a href="#">vzpr</a>	<a href="#">vlx</a>

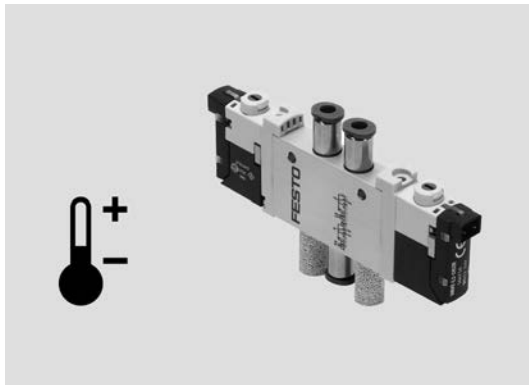
## Pneumatic control systems

				
Type	<b>Quickstepper FSS</b>	<b>Control block for two-hand start ZSB</b>	<b>Adding counter, M5 Compact System PZA, PZV</b>	<b>Timer, M5 Compact System PZVT, PZVT-S, PZVT-FR, PZVT- AUT</b>
Design	Sequencer with 12 switching steps (additive)	Two-hand operation in accordance with EN ISO 12100	Mechanical sequence counter with pneumatic drive	Mechanical sequence counter with pneumatic drive
Pneumatic connection	Barbed connector 3 mm, barbed connector 4 mm	G1/8	M5	female thread M5
Operating pressure	2 ... 6 bar	4 ... 8 bar	2 ... 8 bar	2 ... 6 bar
Type of mounting	2n mounting frame, front panel mounting	Mounting thread, optionally; With through-hole, with female thread	front panel mounting, With through-hole	front panel mounting
Description	<ul style="list-style-type: none"> <li>• Pneumatic/mechanical sequencer with 12 steps and linked to start</li> <li>• Ready-to-install sequence control</li> <li>• Acknowledgement-controlled motion sequences</li> <li>• Fast replacement, tubing can be left in place</li> </ul>	<ul style="list-style-type: none"> <li>• Used wherever manual actuation poses a risk of accident to operating personnel</li> <li>• Safety component in accordance with EU Machinery Directive</li> </ul>	<ul style="list-style-type: none"> <li>• Complete system offering control components with all the functions required for pneumatic sequence controls</li> <li>• For control cabinet installation</li> <li>• Fast replacement of components</li> <li>• Available with protective cap</li> </ul>	<ul style="list-style-type: none"> <li>• Complete system offering control components with all the functions required for pneumatic sequence controls</li> <li>• For control cabinet installation</li> <li>• Fast replacement of components</li> <li>• Mechanical sequence counter with pneumatic drive</li> <li>• Adjustable delay time</li> <li>• Available with protective cap</li> </ul>
online: →	<a href="#">fss</a>	<a href="#">zsb</a>	<a href="#">pza</a>	<a href="#">pzvt</a>

## Pneumatic control systems

Type	 <p>Adding counter CCES</p>
Design	Electric adding counter with battery
Pneumatic connection	
Operating pressure	
Type of mounting	front panel mounting
Description	<ul style="list-style-type: none"> <li>• 8-digit LCD display</li> <li>• Independent power supply</li> <li>• Connection via terminal strip</li> <li>• Reset button</li> </ul>
online: →	<a href="#">cces</a>

## Customised components – for your specific requirements



### Valves with customised designs

Can't find the valve you need in our catalogue? We can offer you customised components that are tailored to your specific requirements – from minor product modifications to complete new product developments.


Common product modifications:

- Coatings for special ambient conditions
- Customised cables: length, pin allocation, pre-assembled with plug
- Modified actuating elements
- Modified connecting threads
- Modified valve sub-bases



Many additional variants are possible. Ask your Festo sales engineer, who will be happy to help.

Further information on customised components can be found on your local website at [www.festo.com](http://www.festo.com)





## Software tool

<p><b>Product finder for valve terminals</b></p>		<p>Find the right valve terminal quickly with the help of the product finder. Start the product finder by clicking on the blue button "Product finder" under "Products". Select your technical features on the left-hand side step-by-step; the selection of suitable products on the right-hand side is automatically updated to reflect the chosen technical features.</p>	<p>The use of logic checks ensures that only correct configurations are available for selection. The product finder for valve terminals is part of the electronic catalogue and is not available as a separate software program.</p>
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## Standards-based valve terminals

<p>Type</p>	 <p><b>Valve manifold, ISO 15407-1</b> <b>VTIA</b></p>	 <p><b>Valve terminal, ISO 15407-2/ISO 5599-2</b> <b>VTSA</b></p>
<p><b>Width</b></p>	<p>18 mm, 26 mm</p>	<p>18 mm, 26 mm, 42 mm, 52 mm, 65 mm</p>
<p><b>Nominal flow rate</b></p>	<p>400 ... 1400 l/min</p>	<p>400 ... 4000 l/min</p>
<p><b>Max. no. of valve positions</b></p>	<p>16</p>	<p>32</p>
<p><b>Electrical actuation</b></p>	<p>individual connection</p>	<p>EtherNet, Fieldbus, multi-pin plug, electrical terminal CPX, integrated controller, individual connection, AS-Interface connection</p>
<p><b>Valve terminal design</b></p>	<p>Modular, valve sizes can be mixed</p>	<p>Modular, valve sizes can be mixed</p>
<p><b>Description</b></p>	<ul style="list-style-type: none"> <li>• Sturdy and flexible valve terminal</li> <li>• Two valve sizes can be combined</li> <li>• Wide range of individual electrical connections</li> </ul>	<ul style="list-style-type: none"> <li>• Sturdy and flexible valve terminal</li> <li>• Widths of 18 mm, 26 mm, 42 mm and 52 mm can be combined on one valve terminal without an adapter</li> <li>• Integrated safety functions</li> </ul>
<p><b>online:</b> →</p>	<p><a href="#">vtia</a></p>	<p><a href="#">vtsa</a></p>




## Universal valve terminals

Type	 <b>Solenoid valve VTUS</b>	 <b>Valve terminal with individual electrical connection VTUG</b>	 <b>Valve terminal with multi-pin plug or fieldbus connection VTUG</b>	 <b>Valve terminal VTUB</b>
<b>Width</b>	21 mm, 25 mm	10 mm, 14 mm, 18 mm	10 mm, 14 mm	20 mm
<b>Nominal flow rate</b>	600... 1300 l/min	80... 1380 l/min	130 ... 630 l/min	200 ... 1000 l/min
<b>Max. no. of valve positions</b>	16	16	24	16
<b>Electrical actuation</b>	individual connection	individual connection	multi-pin plug, I-Port interface, I/O link, Fieldbus	multi-pin plug, I-Port interface, I/O link
<b>Valve terminal design</b>	Fixed grid	Fixed grid	Fixed grid	Fixed grid
<b>Description</b>	<ul style="list-style-type: none"> <li>Reliable and robust valves with long service life</li> <li>Inexpensive universal valves without restrictions where performance is concerned</li> <li>Wide range of valve functions</li> <li>Connection G1/8, G1/4</li> <li>Push-in connector 4, 6, 8 mm</li> <li>Degree of protection IP65/IP67</li> </ul>	<ul style="list-style-type: none"> <li>Sturdy and durable metal components</li> <li>Connection technology easy to change via the E-box</li> <li>Wide range of valve functions</li> <li>Connection M3, M5, M7, G1/8</li> <li>Push-in connector 3, 4, 6, 8 mm</li> <li>Protection class IP40/IP65</li> </ul>	<ul style="list-style-type: none"> <li>Sturdy and durable metal components</li> <li>Excellent price/performance ratio</li> <li>Connection M5, M7, G1/8</li> <li>Push-in connector 3, 4, 6, 8 mm</li> <li>Protection class IP40/IP67</li> </ul>	<ul style="list-style-type: none"> <li>Outstanding economy</li> <li>Easy to operate</li> <li>Optimised for basic applications</li> </ul>
<b>online:</b> →	<a href="#">vtus</a>	<a href="#">vtug-s</a>	<a href="#">vtug</a>	<a href="#">vtub</a>





## Universal valve terminals

Type	 <b>Valve terminal MPA-L</b>	 <b>Valve terminal MPA-S</b>	 <b>Valve terminal VTSA-F</b>	 <b>Valve terminal, Compact Performance CPV</b>
<b>Width</b>	10 mm, 14 mm, 20 mm	10 mm, 20 mm	18 mm, 26 mm, 42 mm, 52 mm, 65 mm	10 mm, 14 mm, 18 mm
<b>Nominal flow rate</b>	0 ... 870 l/min	0 ... 700 l/min	700 ... 4000 l/min	400 ... 1600 l/min
<b>Max. no. of valve positions</b>	32	64	32	8
<b>Electrical actuation</b>	Fieldbus, multi-pin plug, Control blockcontrol block, electrical terminal CPX, I/O link, I-Port	Fieldbus, multi-pin plug, Control blockcontrol block, electrical terminal CPX, AS-Interface, CP installation system, individual connection	EtherNet, Fieldbus, multi-pin plug, electrical terminal CPX, integrated controller, individual connection, AS-Interface connection	AS-Interface, CP installation system, individual connection, Fieldbus, multi-pin plug, I/O link, I-Port
<b>Valve terminal design</b>	Modular, valve sizes can be mixed	Modular, valve sizes can be mixed	Modular, valve sizes can be mixed	Modular
<b>Description</b>	<ul style="list-style-type: none"> <li>Highly modular and versatile</li> <li>Easily expandable in single steps</li> <li>Polymer connecting plates</li> <li>Protection to IP65</li> </ul>	<ul style="list-style-type: none"> <li>Compact dimensions</li> <li>Two valve sizes can be combined</li> <li>Excellent communication options thanks to serial linking</li> </ul>	<ul style="list-style-type: none"> <li>Sturdy and flexible valve terminal</li> <li>Widths of 18 mm, 26 mm, 42 mm and 52 mm can be combined on one valve terminal without an adapter</li> <li>Integrated safety functions</li> </ul>	<ul style="list-style-type: none"> <li>Cubic design: maximum performance in the minimum of space</li> <li>Three sizes</li> <li>Wide range of connection and mounting options</li> </ul>
<b>online:</b> →	<a href="#">mpa-l</a>	<a href="#">mpa-s</a>	<a href="#">vtsa-f</a>	<a href="#">cpv</a>

## Universal valve terminals





Type	 Valve terminal, Smart Cubic CPV-SC	 Valve manifold, Compact Performance CPV10-EX-VI	 Valve terminal VTUB-12
Width	10 mm	10 mm	12 mm, 24 mm
Nominal flow rate	170 l/min	0 ... 400 l/min	230 ... 400 l/min
Max. no. of valve positions	16	8	35
Electrical actuation	CP installation system, individual connection, Fieldbus, multi-pin plug	individual connection	multi-pin plug, I-Port interface, I/O link, Fieldbus
Valve terminal design	Modular		Fixed grid
Description	<ul style="list-style-type: none"> <li>• Compact format</li> <li>• Optimised flow rates</li> <li>• Clear design</li> </ul>	<ul style="list-style-type: none"> <li>• Intrinsically safe valve manifold design to ATEX Category 2 (Zone 1)</li> <li>• Cubic design for exceptional performance and low weight</li> <li>• Extremely robust thanks to the metal valve design</li> <li>• Optimised for installation in a control cabinet</li> <li>• Suitable for pilot control of process valves</li> <li>• High flow rate with extremely compact design</li> </ul>	<ul style="list-style-type: none"> <li>• Compact dimensions</li> <li>• Sturdy poppet valve</li> <li>• Flexible and low-cost fieldbus modules</li> </ul>
online: →	<a href="#">cpv-sc</a>	<a href="#">cpv10-ex</a>	<a href="#">vtub-12</a>

## Application-specific valve terminals


Type	 Valve terminal MPA-C	 Valve terminal VTOC	 Valve terminal MH1	 Valve terminal CDV15.0
Width	14 mm	10 mm	10 mm	24 mm
Nominal flow rate	0 ... 780 l/min	10 l/min	10 l/min	300 ... 650 l/min
Max. no. of valve positions	32	24	24	16
Electrical actuation	multi-pin plug, I/O link, I-Port	multi-pin plug, I-Port interface, I/O link, Fieldbus	individual connection, multi-pin plug	Fieldbus, multi-pin plug
Valve terminal design	Modular	Fixed grid	Fixed grid	Fixed grid
Description	<ul style="list-style-type: none"> <li>• Ideal housing surface design ensures that cleaning agents can run off, thus significantly reducing time and effort spent on cleaning</li> <li>• Excellent corrosion resistance and degree of protection IP69K enable assembly under harsh ambient conditions outside of a control cabinet</li> </ul>	<ul style="list-style-type: none"> <li>• Compact pilot valves for process valves</li> <li>• Various electrical and pneumatic interfaces</li> <li>• Basis for customised adaptations</li> </ul>	<ul style="list-style-type: none"> <li>• Extremely small valves</li> <li>• Low switching noise</li> <li>• Versatile pneumatic connections</li> </ul>	<ul style="list-style-type: none"> <li>• Hygienic</li> <li>• Corrosion resistant</li> <li>• Easy to clean (Clean Design)</li> </ul>
online: →	<a href="#">mpa-c</a>	<a href="#">vtoc</a>	<a href="#">mh1</a>	<a href="#">cdvi</a>



## Electrical peripherals

Type	 Fieldbus module CTEU	 CP electric components CTEC	 Terminal CPX	 Terminal CPX-P
Protocol	AS-Interface, CANopen, CC-Link, DeviceNet, EtherCAT, PROFINET, Profibus DP	INTERBUS, DeviceNet, PROFIBUS, CANopen, CC-Link, EtherNet/IP, PROFINET, EtherCAT, ModbusTCP	INTERBUS, DeviceNet, PROFIBUS, CANopen, CC-Link, EtherNet/IP, PROFINET, EtherCAT, ModbusTCP	DeviceNet, PROFIBUS, EtherNet/IP, PROFINET, ModbusTCP
Max. address volume for inputs	2 ... 64 byte	16 byte	64byte	64byte
Max. address volume for outputs	2 ... 64 byte	16 byte	64byte	64byte
Parameterisation	Activate diagnostics, diagnostic behaviour, failsafe and idle response, failsafe response, watchdog disable, watchdog enable		diagnostic behaviour, failsafe response, forcing of channels, signal setup	diagnostic behaviour, failsafe response, forcing of channels, signal setup
Degree of protection	IP65, IP67	IP65, IP67	IP65, IP67	IP20, IP65
Nominal DC operating voltage	24 ... 30 V	24V	24V	24V
Operating voltage range DC	18 ... 31.6 V	18 ... 30 V	18 ... 30 V	18 ... 30 V
Description	<ul style="list-style-type: none"> <li>For valve terminals VTUG-12, VTUG, MPA-L, CPV, VTOC</li> <li>For installation system CTEL</li> <li>Versatile thanks to protection class IP65/67</li> <li>Fieldbus-typical LEDs, interfaces and switching elements available</li> <li>Isolated power supply for electronics and valves</li> <li>Optional basic diagnostics: undervoltage, short circuit</li> <li>Optionally expandable for low-cost, decentralised installation of two additional valve terminals with I-Port</li> </ul>	<ul style="list-style-type: none"> <li>Complete concept for decentralised machine and system structure</li> <li>Combination of centralised and decentralised installation possible with terminal CPX</li> <li>Decentralised pneumatic components and sensors for fast processes</li> <li>Centralised electric components for fieldbus and common power supply</li> <li>With valve terminal CPV, MPA, CPV-SC</li> </ul>	<ul style="list-style-type: none"> <li>Centralised, decentralised, hybrid installation system with maximum modularity and flexibility</li> <li>Choice of polymer or metal housing with individual linking</li> <li>Open to common fieldbus protocols and Ethernet</li> <li>Integrated diagnostic and service function</li> <li>Operating modes: stand-alone as remote I/O or with valve terminals MPA-S, MPA-L, VTSA/VTSA-F</li> </ul>	<ul style="list-style-type: none"> <li>Use of harmonised remote I/O and valve terminals in a control cabinet</li> <li>Unique modular structure</li> <li>Comprehensive integrated diagnostic and service functions</li> <li>Combination with modules of the electrical terminal CPX, which enables use for hybrid applications</li> </ul>
online: →	<a href="#">cteu</a>	<a href="#">ctec</a>	<a href="#">cpx</a>	<a href="#">cpx-p</a>

## Electrical peripherals

Type	 <b>AS-i module</b> <b>CESA</b>
Protocol	AS-Interface, CANopen, PROFIBUS
Max. address volume for inputs	
Max. address volume for outputs	
Parameterisation	
Degree of protection	IP20
Nominal DC operating voltage	AS-i voltage 30 VDC
Operating voltage range DC	
Description	<ul style="list-style-type: none"> <li>• AS-i master gateway</li> <li>• Double address recognition</li> <li>• Direct operation</li> <li>• Graphic display</li> <li>• Comprehensive diagnostics via LED and display</li> <li>• Specification 3.0</li> </ul>
online: →	<a href="#">cesa</a>

## Customised components – for your specific requirements

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**Valve terminals with customised designs**

Can't find the valve terminal you need in our catalogue?


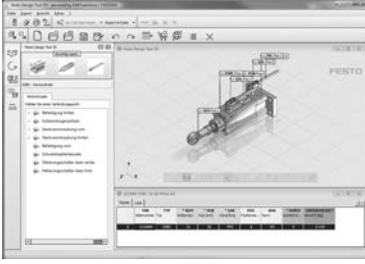
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## Software tool

<b>Configurator</b>		<p>Design a product with numerous features reliably and quickly with the help of the configurator.</p> <p>Select all the required product features step-by-step. The use of logic checks ensures that only correct configurations are available for selection.</p>	<p>The configurator is part of the electronic catalogue and is not available as a separate software program.</p>
<b>Festo Design Tool 3D FDT 3D</b>		<p>The Festo Design Tool 3D is a 3D product configurator for generating specific CAD product combinations from Festo. This configurator makes your search for the right accessory easier, more reliable and faster.</p> <p>You can then order the module that has been created with a single order code – either completely pre-assembled or as individual parts in one box. As a result, your bill of materials is considerably shortened and downstream processes such as product ordering, order picking and assembly are significantly simplified.</p>	<p>All ordering options are available in the following countries: IT, IE, TR, DK, SE, NO, NL, FI, FR, DE, BE, CH, ES, GB, ZA, AT, SK, PL, CZ, HU, SI, RU.</p> <p>This tool can be found</p> <ul style="list-style-type: none"> <li>• either via the address: <a href="http://www.festo.com/FDT-3D">www.festo.com/FDT-3D</a> in the countries listed above,</li> <li>• or on the CD "FDT 3D" (part no. 135595 for the countries listed above)</li> <li>• or on the DVD.</li> </ul>


## Proximity sensors, for T-slot

Type	 Proximity sensor <b>SDBT</b>	 Proximity sensor <b>SMT-8M-A</b>	 Proximity sensor <b>SME-8, SME-8M, SME-8-SL, SME-8-FM</b>	 Proximity sensor <b>SMT-8F, SMT-8G, SMT-8-SL</b>
<b>Electrical connection</b>	2-wire, 3-wire, 2-pin, 3-pin, Cablecable, cable with plug, M12x1, rotatable thread	2-wire, 3-wire, 2-pin, 3-pin, Cablecable, cable with plug, M8x1, M12x1, snap-on flange, rotatable thread	2-wire, 3-wire, 3-pin, Cablecable, cable with plug, M8x1, snap-on flange, plug connector, rotatable thread, open end	2-wire, 3-wire, 3-pin, Cablecable, cable with plug, M8x1, plug connector, rotatable thread
<b>Operating voltage range DC</b>	10 ... 30 V	5 ... 30 V	0 ... 230 V	10 ... 30 V
<b>Switching element function</b>	N/O contact	N/C contact, N/C or N/O contact, switchable, N/O contact	N/O contact, N/C contact	Namur, N/O contact
<b>Switching output</b>	non-contacting, 2-wire, NPN, PNP, non-contacting, 2-wire	non-contacting, 2-wire, NPN, PNP, PNP/NPN, switchable	contacting, bipolar, without LED function	NPN, Namur
<b>Description</b>	<ul style="list-style-type: none"> <li>• Oil-resistant, welding field immune, resistant to welding spatter</li> <li>• Measuring principle: magneto-resistive</li> <li>• Screw-clamped, insertable in the slot from above</li> <li>• Cable length 0.3 ... 5 m</li> </ul>	<ul style="list-style-type: none"> <li>• Short design</li> <li>• Measuring principle: magneto-resistive</li> <li>• Insertable in the slot from above, does not protrude over the cylinder profile</li> <li>• Variant EX2 for use in potentially explosive areas</li> <li>• Cable length 0.1 ... 30 m</li> </ul>	<ul style="list-style-type: none"> <li>• Measuring principle: magnetic reed</li> <li>• Screw-clamped or clamped in the slot, insertable in the slot from above or lengthwise</li> <li>• Cable length 0.3, 2.5, 5, 7.5, 0.2 ... 10 m</li> <li>• Variant suitable for use with energy chains and robots</li> <li>• SME-8-...-S6: heat-resistant design</li> </ul>	<ul style="list-style-type: none"> <li>• Measuring principle: magneto-resistive</li> <li>• Insertable in the slot lengthwise or from above</li> <li>• Type SMT-8-F: in accordance with the ATEX directive for explosive atmospheres</li> <li>• Type SMT-8-G: design ideally matched to gripper sensing</li> <li>• Type SMT-8-SL: sturdy thanks to long guides and plugs directly at the sensor</li> <li>• Cable length 0.3, 2.5, 5 m</li> <li>• Suitable for use with energy chains and robots</li> </ul>
<b>online:</b> →	<a href="#">sdbt</a>	<a href="#">smt-8m</a>	<a href="#">sme-8</a>	<a href="#">smt-8</a>



## Proximity sensors, for T-slot

Type	 Proximity sensor <b>CRSMT-8</b>	 Proximity sensor <b>SMEO-8E</b>	 Proximity sensor <b>SMTO-8E</b>	 Proximity sensor <b>SMPO-8E</b>
Electrical connection	3-wire, Cablecable	2-wire, 3-pin, Cablecable, M8x1, M12x1, plug connector	3-pin, M8x1, M12x1, plug connector	
Operating voltage range DC	10 ... 30 V	0 ... 250 V	10 ... 30 V	
Switching element function	N/O contact	N/O contact	N/O contact	
Switching output	PNP	contacting, contacting, bipolar, without LED function	NPN, PNP	
Description	<ul style="list-style-type: none"> <li>Corrosion-resistant design</li> <li>Suitable for the food industry, resistant to acids and cooling lubricants</li> <li>Measuring principle: magneto-resistive</li> <li>Insertable in the slot lengthwise, flush with the cylinder profile</li> <li>Cable length 2.5, 5 m</li> </ul>	<ul style="list-style-type: none"> <li>Sturdy sensor in block design</li> <li>Measuring principle: magnetic reed</li> <li>Cable length 2.5 m</li> <li>Plug integrated in housing</li> <li>LED switching status display</li> </ul>	<ul style="list-style-type: none"> <li>Sturdy sensor in block design</li> <li>Measuring principle: magneto-resistive</li> <li>Plug integrated in housing</li> <li>LED switching status display</li> </ul>	<ul style="list-style-type: none"> <li>Pneumatic proximity sensor</li> <li>Measuring principle: magnetic</li> <li>Function: 3/2-way valve, normally closed</li> <li>Pneumatic connection via female thread M5</li> <li>Visual switching status indication</li> </ul>
online: →	<a href="#">smt-8</a>	<a href="#">smeo-8e</a>	<a href="#">smt0-8</a>	<a href="#">smo</a>




## Proximity sensors, for T-slot

Type	 Proximity sensor <b>SMTSO-8E</b>
Electrical connection	3-pin, M12x1, plug connector
Operating voltage range DC	10 ... 30 V
Switching element function	N/O contact
Switching output	NPN, PNP
Description	<ul style="list-style-type: none"> <li>Sturdy sensor in block design</li> <li>Welding field immune design</li> <li>Measuring principle: magneto-inductive</li> <li>Plug integrated in housing</li> <li>LED switching status display</li> </ul>
online: →	<a href="#">smtso-8</a>





## Proximity sensors, for C-slot

		
Type	Proximity sensor <b>SME-10, SME-10M</b>	Proximity sensor <b>SMT-10M, SMT-10G</b>
Electrical connection	2-pin, 3-pin, 3-wire, Cablecable, cable with plug, M12, M8x1, snap-on flange, plug connector, rotatable thread, open end	2-pin, 3-pin, 3-wire, Cablecable, cable with plug, M12, M8x1, snap-on flange, rotatable thread, open end
Operating voltage range DC	5 ... 30 V	10 ... 30 V
Switching element function	N/O contact	Namur, N/O contact
Switching output	contacting, bipolar	NPN, PNP, non-contacting, 2-wire
Description	<ul style="list-style-type: none"> <li>Measuring principle: magnetic reed</li> <li>Clamped in C-slot, insertable in the slot from above or lengthwise</li> <li>Cable length 0.3, 2.5 m</li> </ul>	<ul style="list-style-type: none"> <li>Measuring principle: magneto-resistive</li> <li>Clamped in C-slot, insertable in the slot from above or lengthwise</li> <li>Cable length 0.3, 2.5 m</li> </ul>
online: →	<a href="#">sme-10</a>	<a href="#">smt-10</a>




## Proximity sensors, round design

			
Type	Proximity sensor <b>SMEO-4U</b>	Proximity sensor <b>CRSMEO-4</b>	Proximity sensor <b>SMTO-4U</b>
Electrical connection	2-wire, 3-wire, 3-pin, Cablecable, M8x1, M12x1, plug connector	3-wire, Cablecable	3-wire, 3-pin, Cablecable, M8x1, M12x1, plug connector
Operating voltage range DC	0 ... 250 V	12 ... 30 V	10 ... 30 V
Switching element function	N/O contact	N/O contact	N/O contact
Switching output	contacting, contacting, bipolar, without LED function	contacting, bipolar	NPN, PNP
Description	<ul style="list-style-type: none"> <li>Measuring principle: magnetic reed</li> <li>Cable length 2.5, 5 m</li> <li>U-shaped housing</li> </ul>	<ul style="list-style-type: none"> <li>Corrosion-resistant design</li> <li>Measuring principle: magnetic reed</li> <li>Cable length 2.5 m</li> <li>Straight housing</li> </ul>	<ul style="list-style-type: none"> <li>Measuring principle: magneto-inductive</li> <li>Cable length 2.5 m</li> <li>U-shaped housing</li> </ul>
online: →	<a href="#">smeo-4</a>	<a href="#">crsmeo-4</a>	<a href="#">smt-4</a>


## Proximity sensors, block design

				
Type	Proximity sensor SME-1	Proximity sensor SMT-C1	Proximity sensor SMEO-1	Proximity sensor SMEO-2
Electrical connection	2-wire, 3-wire, 3-pin, Cablecable, M8x1, plug connector	3-wire, 3-pin, Cablecable, cable with plug, M8x1, M12x1, rotatable thread	2-wire, 3-wire, 3-pin, Cablecable, M8x1, M12x1, plug connector	Connector socket to EN 175301-803 (DIN 43650)
Operating voltage range DC	0 ... 200 V	10 ... 30 V	0 ... 250 V	0 ... 200 V
Switching element function	N/O contact	N/O contact	N/O contact	N/O contact
Switching output	contacting, bipolar	PNP	contacting, contacting, bipolar, without LED function	
Description	<ul style="list-style-type: none"> <li>• For mounting kit</li> <li>• Measuring principle: mag-neto-inductive</li> <li>• With and without LED switching status indication</li> </ul>	<ul style="list-style-type: none"> <li>• Measuring principle: mag-neto-inductive</li> <li>• LED switching status display</li> <li>• For Clean Design standard cylinder DSBF with mounting rail for sensors</li> </ul>	<ul style="list-style-type: none"> <li>• Measuring principle: magnetic reed</li> <li>• Cable length 2.5, 5 m</li> <li>• SMEO-1-S6: heat-resistant design</li> <li>• Designs with and without LED switching status display</li> </ul>	<ul style="list-style-type: none"> <li>• For mounting kit</li> <li>• Measuring principle: mag-neto-inductive</li> <li>• With and without LED switching status indication</li> </ul>
online: →	<a href="#">sme-1</a>	<a href="#">smt-c1</a>	<a href="#">smeo-1</a>	<a href="#">smeo</a>





## Proximity sensors, block design

			
Type	Proximity sensor SMT0-1	Proximity sensor SMTSO-1	Proximity sensor SMP0-1
Electrical connection	3-wire, 3-pin, Cablecable, M8x1, plug connector	3-pin, M12x1, plug connector	
Operating voltage range DC	10 ... 30 V	10 ... 30 V	
Switching element function	N/O contact	N/O contact	
Switching output	NPN, PNP	PNP	
Description	<ul style="list-style-type: none"> <li>• Measuring principle: magneto-resistive</li> <li>• Cable length 2.5 m</li> <li>• LED switching status display</li> </ul>	<ul style="list-style-type: none"> <li>• Measuring principle: magneto-resistive</li> <li>• Welding field-resistant design</li> <li>• LED switching status display</li> </ul>	<ul style="list-style-type: none"> <li>• 3/2-way valve, normally closed</li> <li>• Pneumatic proximity sensor</li> <li>• Measuring principle: magnetic</li> <li>• Pneumatic connection via barbed connector for tubing I.D. 3 mm</li> <li>• Visual switching status indication</li> </ul>
online: →	<a href="#">smt0-1</a>	<a href="#">smtso-1</a>	<a href="#">smpo</a>




## Cylinder signal generators

Type	 <p>Cylinder signal generators PPL</p>
Nominal flow rate	48 l/min
Operating pressure	1 ... 8 bar
Pneumatic connection	Barbed connector for 3 mm I.D. plastic tubing
Type of mounting	Hollow screw G1/8, hollow screw G1/4
Description	<ul style="list-style-type: none"> <li>• For contactless pneumatic signal generation at the end of cylinder strokes</li> <li>• Function: 3/2-way valve, normally closed</li> <li>• Can be screwed directly into the supply port of the cylinder using a hollow bolt</li> </ul>
online: →	<a href="#">ppl</a>





## Inductive sensors

Type	 <p>Proximity sensor SIEA</p>	 <p>Proximity sensor SIED</p>	 <p>Proximity sensor SIEF</p>	 <p>Proximity sensor SIEH</p>
Size	M8, M12, M18, M30	M12, M18, M30	40x40x65 mm, M8, M12, M18, M30	3mm, M12, M18
Switching output		non-contacting, 2-wire	NPN, PNP	NPN, PNP
Switching element function		N/O contact, N/C contact	Antivalent, N/O contact	N/O contact, N/C contact
Electrical connection	3-pin, 4-pin, M8x1, M12x1, plug connector	2-wire, 2-pin, Cablecable, M12x1, plug connector	3-wire, 3-pin, 4-pin, Fixcon, Cablecable, M8x1, M12x1, plug connector	3-wire, 3-pin, Cablecable, cable with plug, M8x1, M12x1, plug connector
Operating voltage range DC	15 ... 30 V	10 ... 320 V	10 ... 30 V	10 ... 30 V
Description	<ul style="list-style-type: none"> <li>• With analogue output</li> <li>• Flush mounting</li> <li>• Metric thread</li> </ul>	<ul style="list-style-type: none"> <li>• With standard switching distance</li> <li>• For DC and AC voltage</li> <li>• Metric thread</li> <li>• Flush or non-flush mounting</li> <li>• With switching status indication</li> <li>• Design with metal or polyamide housing</li> </ul>	<ul style="list-style-type: none"> <li>• Reduction factor 1 for all metals</li> <li>• Welding field immune</li> <li>• Flush, partially flush or non-flush mounting</li> <li>• With switching status indication</li> <li>• Design with housing resistant to welding spatter</li> </ul>	<ul style="list-style-type: none"> <li>• With increased switching distance</li> <li>• Flush mounting</li> <li>• Metric thread</li> <li>• With switching status indication</li> <li>• Design with stainless steel housing</li> </ul>
online: →	<a href="#">siea</a>	<a href="#">sied</a>	<a href="#">sief</a>	<a href="#">sieh</a>

## Inductive sensors



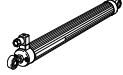
Type	 <b>Proximity sensor SIEN</b>	 <b>Proximity sensor SIES-Q</b>	 <b>Proximity sensor SIES-8M</b>
<b>Size</b>	4 mm, 6.5 mm, M5x 0.5, M8x1, M12, M12x1, M18, M18x1, M30, M30x1.5	12x26x40 mm, 15x20x30 mm, 40x40x120 mm, 5x5x25 mm, 8x8x40 mm	T-slot
<b>Switching output</b>	NPN, PNP	NPN, PNP	NPN, PNP
<b>Switching element function</b>	N/O contact, N/C contact	Antivalent, N/O contact, N/C contact	N/O contact, N/C contact
<b>Electrical connection</b>	3-wire, 3-pin, Cablecable, M8x1, M12x1, plug connector	3-wire, 3-pin, Cablecable, cable with plug, M8x1, screw terminal, plug connector, rotatable thread	3-wire, 3-pin, Cablecable, cable with plug, M8x1, rotatable thread
<b>Operating voltage range DC</b>	10 ... 30 V	10 ... 30 V	10 ... 30 V
<b>Description</b>	<ul style="list-style-type: none"> <li>• With standard switching distance</li> <li>• For DC voltage</li> <li>• Round design</li> <li>• Metric thread</li> <li>• Flush or non-flush mounting</li> <li>• With switching status indication</li> <li>• Design with metal housing</li> <li>• Design with polyamide housing</li> </ul>	<ul style="list-style-type: none"> <li>• Block design</li> <li>• Flush mounting</li> <li>• With switching status indication</li> </ul>	<ul style="list-style-type: none"> <li>• Suitable for position sensing for electric axes EGC and grippers with T-slot</li> <li>• With 2 LEDs for better visibility</li> <li>• Flush mounting</li> </ul>
<b>online:</b> →	<a href="#">sien</a>	<a href="#">sies-q</a>	<a href="#">sies-8m</a>

## Position sensors





Type	 <b>Position transmitter SDAT-MHS</b>	 <b>Position transmitter SMAT-8E</b>	 <b>Position transmitter SMAT-8M</b>	 <b>Position sensor SMH-S1</b>
<b>Design</b>	for T-slot	for T-slot	for T-slot	for gripper
<b>Position measuring range</b>	0 ... 160 mm	0 ... 50 mm	0 ... 40 mm	
<b>Analogue output</b>	0 ... 20 mA	0 ... 10 V, 0 ... 20 mA	0 ... 10 V	
<b>Electrical connection</b>	4-pin, rotatable thread, cable with plug, M 8	4-pin, M8x1, plug connector	4-pin, cable with plug, M8x1, rotatable thread	4-pin, cable with plug, M8x1
<b>Description</b>	<ul style="list-style-type: none"> <li>• Sensor principle: Hall sensor</li> <li>• Insertable in the slot from above, secured with screw</li> <li>• Variant with cable attributes suitable for use with energy chains and robots</li> <li>• LED status display</li> <li>• Cable length 0.3 m</li> </ul>	<ul style="list-style-type: none"> <li>• Measuring principle: magnetic</li> <li>• Insertable in the slot length-wise</li> <li>• Current and voltage signal at the analogue output</li> <li>• Variant with cable attributes suitable for use with energy chains and robots</li> <li>• LED status display</li> <li>• Cable length 2.5 m, 5 m</li> </ul>	<ul style="list-style-type: none"> <li>• Measuring principle: magnetic</li> <li>• Insertable in the slot from above, central clamping</li> <li>• Displacement-proportional analogue output signal</li> <li>• Variant with cable attributes suitable for use with energy chains and robots</li> <li>• LED status display</li> <li>• Cable length 0.3 m</li> </ul>	<ul style="list-style-type: none"> <li>• Measuring principle: magnetic Hall</li> <li>• Freely selectable switching points</li> <li>• 3 gripper positions can be detected using an evaluation unit</li> </ul>
<b>online:</b> →	<a href="#">sdat</a>	<a href="#">smat-8e</a>	<a href="#">smat-8m</a>	<a href="#">smh-s1</a>







## Position sensors

Type	 <b>Displacement encoder MME-MTS-TLF</b>	 <b>Displacement encoder MLO-POT-TLF</b>	 <b>Displacement encoder MLO-POT-LWG</b>
<b>Stroke</b>	225 ... 2000 mm	225 ... 2000 mm	100 ... 750 mm
<b>Measuring principle of displacement encoder</b>	digital	Analogue	Analogue
<b>Output signal</b>	CAN protocol type SPC-AIF	Analogue	Analogue
<b>Displacement resolution</b>	0 ... 0.01 mm	0.01mm	0.01mm
<b>Description</b>	<ul style="list-style-type: none"> <li>Measuring principle: magnetostrictive</li> <li>Contactless with absolute measurements</li> <li>High travel speeds</li> <li>System product for servopneumatic positioning technology and Soft Stop</li> </ul>	<ul style="list-style-type: none"> <li>Conductive plastic potentiometer</li> <li>Absolute measurement with high resolution</li> <li>High travel speeds and long service life</li> <li>Several mounting options on pneumatic linear drives DGPL</li> <li>Plug-in connections</li> </ul>	<ul style="list-style-type: none"> <li>Connecting rod potentiometer</li> <li>Absolute measurement with high resolution</li> <li>Long service life</li> <li>High protection class</li> <li>Plug-in connections</li> </ul>
<b>online:</b> →	<a href="#">mme</a>	<a href="#">mlo</a>	<a href="#">mlo</a>



## Pressure and vacuum sensors

Type	 <b>Pressure sensor SPAW</b>	 <b>Pressure switch SPBA</b>	 <b>Pressure transmitter SPTE</b>	 <b>Pressure transmitter SPTW</b>
<b>Pressure measuring range</b>	-1 ... 100 bar		-1 ... 10 bar	-1 ... 10 bar
<b>Switching element function</b>	switchable	Antivalent, changeover switch		
<b>Pneumatic connection</b>	Male thread G1/2, female thread G1/4	G1/8	Flange, QS-3, QS-4, push-in sleeve QS-4, push-in sleeve QS-6	G1/4
<b>Electrical connection</b>	plug connector, to EN 60947-5-2, M12x1, 4-pin, 5-pin, round design	plug connector, to EN 60947-5-2, M12x1, 4-pin, round	3-wire, Cablecable, open end	4-pin, M12x1, plug connector, to EN60947-5-2, round design
<b>Display type</b>	4-place alphanumeric, LED display			
<b>Description</b>	<ul style="list-style-type: none"> <li>Highly robust</li> <li>For liquid and gaseous media</li> <li>Quick and easy setting of the switching outputs using three pushbuttons</li> <li>Optimum legibility of the display in any mounting position</li> </ul>	<ul style="list-style-type: none"> <li>For solenoid valve VSVA</li> <li>Pressure sensor with permanently set switching point</li> <li>Mounting: screw-in</li> </ul>	<ul style="list-style-type: none"> <li>Piezoresistive pressure sensor</li> <li>Measured variable: relative pressure</li> <li>Cable length 2.5 m</li> </ul>	<ul style="list-style-type: none"> <li>Sensor versions: piezoresistive pressure sensor or metal thin-film pressure sensor</li> <li>Measured variable: relative pressure</li> </ul>
<b>online:</b> →	<a href="#">spaw</a>	<a href="#">spba</a>	<a href="#">spte</a>	<a href="#">sptw</a>





## Pressure and vacuum sensors

				
Type	Pressure sensor SPAB	Pressure switch, vacuum switch PEV, VPEV	PE converter PEN, PE, VPE	Pressure sensor SDE1
Pressure measuring range	-1 ... 10 bar	-1 ... 10 bar	-1...8bar	-1 ... 10 bar
Switching element function	switchable	changeover switch	N/O contact, changeover switch	switchable
Pneumatic connection	Male thread G1/8, male thread NPT1/8-27, male thread R1/8, female thread M5	G1/8, G1/4, M5	G1/8, M5, PK-3, PK-4	G1/8, QS-4, R1/8, R1/4
Electrical connection	4-wire, 4-pin, Cablecable, M8x1, plug connector, to EN 60947-5-2, round design, square design	4-pin, type A, M8x1, M12x1, screw terminal, plug connector, according to DIN 43650, to EN 60947-5-2, round design, square design	3 connector leads, 3-wire, 4-wire, Cablecable, screw terminal	3-pin, 4-pin, 5-pin, cable with plug, M8x1, M12x1, plug connector, to EN 60947-5-2, round design
Display type	Illuminated LCD, multi-colour			Illuminated LCD, back-lit LCD
Description	<ul style="list-style-type: none"> <li>Relative pressure measurement</li> <li>Switching output PNP, NPN and analogue output</li> <li>Two-part, multi-coloured display</li> <li>Easy commissioning thanks to intuitive operation</li> <li>Compact design 30x30 mm</li> <li>Certification: c UL us listed (OL), C-Tick</li> </ul>	<ul style="list-style-type: none"> <li>Mechanical pressure and vacuum switch</li> <li>Adjustable switching point</li> <li>Screw-in, via through-holes or via H-rail</li> <li>Visual scale for pressure adjustment</li> <li>Certification: CCC</li> </ul>	<ul style="list-style-type: none"> <li>Pneumatic/electric differential pressure switch</li> <li>Pneumatic/electric pressure transducer</li> <li>Design for vacuum</li> <li>Mounting on mounting frame 2N</li> <li>Splash-proof design</li> <li>Certification: CCC</li> </ul>	<ul style="list-style-type: none"> <li>Five pressure measuring ranges</li> <li>Measurement of relative or differential pressure</li> <li>Switching outputs PNP, NPN and with analogue current or voltage output</li> <li>LCD or illuminated LCD display</li> <li>Via H-rail, via wall/surface bracket, mounting on service unit, front panel mounting</li> <li>Certification: c UL us listed (OL), C-Tick</li> </ul>
online: →	<a href="#">spab</a>	<a href="#">pev</a>	<a href="#">pen</a>	<a href="#">sde1</a>


## Pressure and vacuum sensors

		
Type	Pressure sensor SDE3	Pressure sensor SDE5
Pressure measuring range	-1 ... 10 bar	-1 ... 10 bar
Switching element function	switchable	N/O contact, switchable, N/C contact
Pneumatic connection	QS 5/32, QS 4	QS-5/32, QS-1/4, QS-4, QS-6
Electrical connection	4-pin, 5-pin, Cablecable, cable with plug, M8x1, M12x1, plug connector, to EN 60947-5-2, round design	3-wire, 3-pin, Cablecable, M8x1, plug connector, to EN 60947-5-2, round design
Display type	Illuminated LCD	
Description	<ul style="list-style-type: none"> <li>Five pressure measuring ranges</li> <li>Measurement of relative or differential pressure or 2 independent pressure inputs</li> <li>Switching output 2x PNP or 2x NPN</li> <li>Numerical and graphical pressure display</li> <li>Via H-rail, via wall/surface bracket, front panel mounting, via through-holes</li> <li>Certification: C-Tick, ATEX, c UL us - Listed (OL)</li> </ul>	<ul style="list-style-type: none"> <li>Programmable and configurable pressure switch for simple pressure sensing tasks</li> <li>Threshold/window comparator</li> <li>Teach-in function for programming</li> <li>Integrated microprocessor</li> <li>Switching status indicated by an LED visible from all sides</li> <li>Certification: c UL us listed (OL), C-Tick</li> </ul>
online: →	<a href="#">sde3</a>	<a href="#">sde5</a>





## Flow sensors

Type	 Flow sensor SFAB	 Flow sensor SFAM	 Flow sensor SFE3	 Flow sensor SFET
<b>Flow measuring range</b>	0.1 ... 1000 l/min	10 ... 15000 l/min	0.05 ... 50 l/min	-10 ... 50 l/min
<b>Operating medium</b>	Compressed air to ISO 8573-1:2010 [6:4:4], Compressed air to ISO 8573-1:2010 [7:4:4], nitrogen	Compressed air to ISO 8573-1:2010 [7:4:4], nitrogen	Compressed air to ISO 8573-1:2010 [1:4:2], nitrogen	Compressed air to ISO 8573-1:2010 [1:4:2], nitrogen
<b>Operating pressure</b>	0 ... 10 bar	0 ... 16 bar	-0.7 ... 7 bar	-0.9 ... 7 bar
<b>Pneumatic connection</b>	QS-5/16, QS-1/4, QS-3/8, QS-6, QS-8, QS-10, QS-12	Manifold module, G1/2, G1, G1 1/2, NPT1 1/2-11 1/2, NPT1-11 1/2, NPT1/2-14	female thread G1/8, QS-6	female thread G1/8, QS-4, QS-6
<b>Electrical connection</b>	5-pin, M12x1, straight plug	5-pin, M12x1, straight plug	Cablecable	Cablecable
<b>Description</b>	<ul style="list-style-type: none"> <li>Flow sensor with integrated digital display</li> <li>With unidirectional flow input</li> <li>Mounting: H-rail mounting, wall or surface mounting</li> <li>Certification: C-Tick</li> </ul>	<ul style="list-style-type: none"> <li>Stand-alone device or combined with MS series service units</li> <li>Supplies absolute flow information and accumulated air consumption measurement</li> <li>Covers large measuring range with great precision thanks to high dynamic response</li> <li>Large, illuminated LCD display</li> </ul>	<ul style="list-style-type: none"> <li>Flow sensor with integrated digital display</li> <li>With unidirectional flow input</li> <li>Mounting: via through-holes or mounting bracket</li> <li>Electrical connection via open cable end</li> <li>Cable length 1 m</li> <li>Certification: C-Tick</li> </ul>	<ul style="list-style-type: none"> <li>With unidirectional (SFET-F) or bidirectional (SFET-R) flow input</li> <li>Mounting: via through-holes or mounting bracket</li> <li>Electrical connection via open cable end</li> <li>Cable length 1 m, 3 m</li> <li>Certification: C-Tick</li> </ul>
<b>online:</b> →	<a href="#">sfab</a>	<a href="#">sfam</a>	<a href="#">sfe3</a>	<a href="#">sfet</a>





## Flow sensors

Type	 Flow indicator SFEV
<b>Flow measuring range</b>	
<b>Operating medium</b>	
<b>Operating pressure</b>	
<b>Pneumatic connection</b>	
<b>Electrical connection</b>	Cablecable
<b>Description</b>	<ul style="list-style-type: none"> <li>For flow sensor SFET</li> <li>3 1/2-digit alphanumeric display</li> <li>Indicating range: 0.05 ... 50 l/min (for flow sensor SFET-F); -0.05 ... +10 l/min (for flow sensor SFET-R)</li> </ul>
<b>online:</b> →	<a href="#">sfev</a>



## Opto-electronic sensors

Type	 <b>Sensor</b> <b>SOEG-RT, SOEG-RS</b>	 <b>Through-beam sensor</b> <b>SOEG-E, SOEG-S</b>	 <b>Fibre-optic unit</b> <b>SOEG-L</b>	 <b>Laser diffuse sensor, laser retro-reflective sensor</b> <b>SOEL-RT, SOEL-RS</b>
<b>Method of measurement</b>	diffuse sensor, retro-reflective sensor, diffuse sensor with background suppression, diffuse sensor with cylindrical light beam, distance sensor, for transparent objects, laser retro-reflective sensor	Through-beam sensor, receiver, transmitter	Fibre-optic unit	Contrast sensor, diffuse sensor with background suppression, laser retro-reflective sensor
<b>Working range</b>	0 ... 5500 mm	0 ... 20000 mm	0 ... 250 mm	0 ... 20000 mm
<b>Size</b>	Diameter 4 mm, M5, M12x1, M18x1, straight, M18x1, angled, 20x32x12 mm, 30x30x15 mm, 50x50x17 mm	M18x1, straight, M18x1, angled, 20x32x12 mm, 30x30x15 mm, 50x50x17 mm	20x32x12 mm, 30x30x15 mm	20x32x12 mm, 50x50x17 mm
<b>Type of light</b>	Infrared, red, red polarised	Infrared, red	red	Laser, red, red polarised
<b>Switching output</b>	NPN, PNP	NPN, PNP	NPN, PNP	NPN, PNP
<b>Description</b>	<ul style="list-style-type: none"> <li>• Round design, block design</li> <li>• Setting option: teach-in by means of button and via electrical connection</li> <li>• Electrical connection via open cable end or plug</li> </ul>	<ul style="list-style-type: none"> <li>• Round design, block design</li> <li>• Setting option: potentiometer, teach-in or teach-in via electrical connection</li> <li>• Electrical connection via open cable end or plug</li> </ul>	<ul style="list-style-type: none"> <li>• Block design</li> <li>• Setting option: potentiometer, teach-in, teach-in via electrical connection</li> <li>• Electrical connection via open cable end or plug</li> </ul>	<ul style="list-style-type: none"> <li>• Setting option: teach-in, teach-in via electrical connection, potentiometer</li> <li>• Electrical connection via open cable end or plug</li> </ul>
<b>online:</b> →	<a href="#">soeg-r</a>	<a href="#">soeg-e</a>	<a href="#">soeg-l</a>	<a href="#">soel</a>





## Opto-electronic sensors

Type	 <b>Colour sensor SOEC</b>	 <b>Fibre-optic unit SOE4</b>	 <b>Fork light barrier SOOF</b>	 <b>Fibre-optic cable SOOC, SOEZ</b>
<b>Method of measurement</b>	Colour sensor	Fibre-optic unit	Fork light barrier	Through-beam sensor, fixed focus, Fork light barrier, diffuse sensor
<b>Working range</b>	12 ... 32 mm	2 ... 2000 mm		2 ... 650 mm
<b>Size</b>	50x50x17 mm		Fork 120x60 mm, fork 30x35 mm, fork 50x55 mm, fork 80x55 mm	
<b>Type of light</b>	White	red	red	
<b>Switching output</b>	PNP	NPN, PNP	NPN, PNP	
<b>Description</b>	<ul style="list-style-type: none"> <li>• Diffuse sensor</li> <li>• Block design</li> <li>• Setting option: teach-in, teach-in via electrical connection</li> <li>• Electrical connection via M12x1 plug, 8-pin</li> <li>• Display via 7 LEDs</li> </ul>	<ul style="list-style-type: none"> <li>• Use for precise and space-saving position sensing in electronics and light assembly</li> <li>• Switching frequencies of up to 8000Hz</li> <li>• Operational with fibre-optic cable SOOC as accessory</li> <li>• Variants: LED or LED display, timer function</li> <li>• Setting option: teach-in</li> <li>• H-rail mounting or via through-holes</li> <li>• With protection against mutual interference</li> </ul>	<ul style="list-style-type: none"> <li>• Through-beam sensor with minimal installation effort</li> <li>• Design: polymer or metal</li> <li>• Sturdy housing: high shock and vibration resistance</li> <li>• Protection to IP67</li> <li>• Electrical connection via M8x1 plug, 3-pin</li> <li>• Setting option: potentiometer or teach-in</li> <li>• LED displays</li> </ul>	<ul style="list-style-type: none"> <li>• Thread M4, M6</li> <li>• Voltage 10 ... 30 V DC</li> <li>• Cable connection, push-in connector</li> </ul>
<b>online:</b> →	<a href="#">soec</a>	<a href="#">soe4</a>	<a href="#">soof</a>	<a href="#">sooc</a>





## Signal converter

Type	 <b>Signal converters SVE4</b>	 <b>Evaluation unit SMH-AE</b>
<b>Signal range</b>	0 ... 10 V +/-0.3 V, 0 ... 20 mA +/-0.6 mA, adapted for position sensors SMH-S1-HG	
<b>Switching output</b>	2xNPN, 2xPNP	NPN, PNP
<b>Switching function</b>	Freely programmable	
<b>Electrical connection, output</b>	4-pin, M8x1, plug connector, to EN 60947-5-2	5-pin, plug connector, M12x1
<b>Electrical connection, input</b>	4-pin, socket,, M8x1, to EN 60947-5-2	4-pin, socket,, M8x1, to EN 60947-5-2
<b>Description</b>	<ul style="list-style-type: none"> <li>• Converts analogue signals into switching points</li> <li>• Switching function freely programmable with teach-in</li> <li>• Threshold value, hysteresis or window comparator</li> <li>• Mounting directly on H-rail or via adapter plate</li> <li>• LED switching status display</li> <li>• Certification: c UL us listed (OL), C-Tick</li> </ul>	<ul style="list-style-type: none"> <li>• Electronic evaluation unit for Hall sensor SMH-S1</li> <li>• Amplifies the signal from the sensor</li> <li>• With 3 potentiometers for setting 3 switching points</li> <li>• LED operating and switching status display</li> </ul>
<b>online:</b> →	<a href="#">sve4</a>	<a href="#">smh-ae</a>


## Air gap sensors

Type	 Air gap sensor SOPA	 Micro reflex sensor, reflex sensor RML, RFL	 Back-pressure end stop SD-2, SD-3, SD-3-N	 Air barriers SFL, SML
<b>Sensing range</b>	20 ... 200 µm	Distance between nozzles 4.8 ... 5.1 mm, 4.5 ... 15.5 mm	Distance between nozzles 0 ... 0.5 mm	Distance between nozzles 5 ... 50 mm, up to 100 mm
<b>Operating pressure</b>	4 ... 7 bar	0.075 ... 0.5 bar, 0.1 ... 1.5 bar	0 ... 8 bar	0.1 ... 0.4 bar, 0.1 ... 4 bar, 0 ... 8 bar
<b>Display type</b>	Illuminated LCD, multi-colour	Signal pressure $\geq 0.5$ mbar	Pressure signal 0 ... 8 bar	Pressure signal
<b>Operating medium</b>	Compressed air to ISO 8573-1:2010 [7:4:4]	Filtered, unlubricated compressed air	Compressed air, filtered, lubricated or unlubricated	Filtered, unlubricated compressed air
<b>Description</b>	<ul style="list-style-type: none"> <li>Convenient solution for high-precision contact and distance monitoring</li> <li>Setting option: teach-in or numerical setting using three buttons</li> <li>Integrated air jet function</li> <li>Multi-coloured LCD display</li> <li>H-rail, wall mounting, via through-holes</li> <li>Certification: C-Tick</li> </ul>	<ul style="list-style-type: none"> <li>Back pressure actuated valve</li> <li>For contactless sensing of indicating instruments, checking pressing and stamping tools, edge control, magazine control, for measuring and counting</li> <li>Can be used even in very dirty environments, in complete darkness, with translucent or magnetic objects</li> </ul>	<ul style="list-style-type: none"> <li>Can be used for stroke-dependent signal generation as a limit switch and fixed stop</li> <li>Type SD-3-N for sensing fluid levels and heavily foaming liquids</li> <li>Ideal for end-position sensing and position control with high accuracy requirements and small actuating forces</li> <li>For use in places difficult to access</li> </ul>	<ul style="list-style-type: none"> <li>Sender nozzle, receiver nozzle, gap sensor</li> <li>Back pressure actuated valve</li> <li>Operational reliability even in very dirty environments</li> <li>Reliable even with high ambient temperatures</li> <li>Resistant to magnetic influences and sound waves</li> <li>Reliable even in complete darkness and when sensing of translucent objects</li> </ul>
<b>online:</b> →	<a href="#">sopa</a>	<a href="#">rfl</a>	<a href="#">sd</a>	<a href="#">sml</a>



## Sensor boxes

Type	 Sensor box SRAP	 Sensor box SRBP	 Limit switch attachment SRBF	 Limit switch attachment DAPZ
<b>Measured variable</b>	Rotation angle	Rotation angle		
<b>Operating voltage range AC</b>		19.2 ... 28.8 V	0 ... 250 V	0 ... 250 V
<b>Operating voltage range DC</b>	15 ... 30 V	7.8 ... 28.8 V	0 ... 24 V	0 ... 250 V
<b>Electrical connection</b>	9-pin, screw terminal, plug-in	9-pin, screw terminal, plug-in		screw terminal, plug-in
<b>Type of mounting</b>	Adapter kit DASB, coupling DARQ	Adapter kit DASB, coupling DARQ	on flange to ISO 5211, via accessories	Kit DAPZ-...-RO
<b>Description</b>	<ul style="list-style-type: none"> <li>Based on standard VDI/VDE 3845 (NAMUR)</li> <li>Analogue</li> <li>For monitoring the position of semi-rotary actuators</li> <li>Sensors based on 2D Hall technology</li> </ul>	<ul style="list-style-type: none"> <li>Based on standard VDI/VDE 3845 (NAMUR)</li> <li>Binary</li> <li>Position indicator for semi-rotary actuators</li> <li>Sensors based on reed technology</li> </ul>	<ul style="list-style-type: none"> <li>Based on ISO 5211, DIN EN 60947-5-1</li> <li>With two mechanical switches</li> <li>For mechanical, electric proximity sensor</li> </ul>	<ul style="list-style-type: none"> <li>Square or round design</li> <li>Drive interface to NAMUR VDI/VDE 3845</li> <li>With pneumatic, electric or inductive sensing</li> </ul>
<b>online:</b> →	<a href="#">srp</a>	<a href="#">srbp</a>	<a href="#">srbf</a>	<a href="#">dapz</a>


## Sensor boxes

Type	 <b>Limit switch attachment</b> <b>QH-DR-E</b>
Measured variable	
Operating voltage range AC	0 ... 250 V
Operating voltage range DC	0 ... 250 V
Electrical connection	screw terminal
Type of mounting	With through-hole
Description	<ul style="list-style-type: none"> <li>• Three measuring principles: pneumatic; mechanical; electric; inductive</li> </ul>
online: →	<a href="#">qh-dr</a>



## Electromechanical switches

Type	 <b>Micro switch</b> <b>S-3</b>	 <b>Electrical limit switch</b> <b>EL, ER</b>
Operating voltage range AC	12 ... 250 V	0... 250 V
Operating voltage range DC	12 ... 250 V	0 ... 250 V
Electrical connection	Screw connector	4-wire cable with protective conductor, 1.1 m long
Degree of protection	IP00	IP54
Type of mounting	2 through-holes in housing, mounting plate	2 through-holes in housing
Description	<ul style="list-style-type: none"> <li>• Electrical limit switch</li> <li>• N/C contact, N/O contact, changeover switch</li> <li>• Actuator attachments: roller lever type AR, roller lever with idle return type AL, whisker attachment type AF</li> </ul>	<ul style="list-style-type: none"> <li>• For signalling in end positions</li> <li>• Max. switching frequency 200/min.</li> <li>• With roller lever or with toggle lever and idle return</li> <li>• N/C contact, N/O contact, changeover switch</li> </ul>
online: →	<a href="#">s-3</a>	<a href="#">el</a>

## Vision sensors



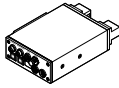

	
Type	Code reader, object sensor SBSI-B, SBSI-Q
Sensor resolution	736 x 480 pixels (wide VGA)
Working distance	6 mm ... infinite
Field of vision	Min. 5x4 mm, min. 8x6 mm
Frame rate (full image)	50 fps
Max. number of test programs/jobs	8
Focal length	6 ... 12 mm
Description	<ul style="list-style-type: none"> <li>• Vision sensor with integrated lighting/lens</li> <li>• Enabling reading of 1D/2D codes or quality inspection of parts</li> <li>• Intuitive software for simple parameter setting</li> <li>• All-in-one device with optical system, lighting, evaluation and communication</li> </ul>
online: →	<a href="#">sbsi</a>

## Diagnostics for fast processes

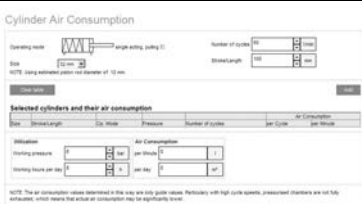

		
Type	Compact Vision System SBOA-M	Compact Vision System SBOC-M
Sensor resolution	640 x 480 pixels (VGA)	640 x 480 pixels (VGA)
Working distance	Depends on the lens chosen	Depends on the lens chosen
Field of vision	Depends on the lens chosen	Depends on the lens chosen
Frame rate (full image)	27 ... 241 fps	27 ... 241 fps
Exposure time	1 ... 1000000 µs	1 ... 1000000 µs
Description	<ul style="list-style-type: none"> <li>• Systainer with compact vision system SBOC-M</li> </ul>	<ul style="list-style-type: none"> <li>• High-speed camera for diagnostics and commissioning as well as for function monitoring of fast motion sequences</li> <li>• Recording and storage electronics integrated in the camera</li> <li>• For standard lens with C mount connection</li> <li>• Can be networked via Ethernet</li> <li>• Compact dimensions, low weight</li> </ul>
online: →	<a href="#">sbox</a>	<a href="#">sbox</a>




## Position and quality inspection

Type	 Compact Vision System SBQC-Q	 Compact Vision System SBOI-Q	 Checkbox Compact CHB-C	 Checkbox CHB
<b>Sensor resolution</b>	1280 x 1024 pixels (SXGA), 640 x 480 pixels (VGA), 752 x 480 pixels (WideVGA)	640 x 480 pixels (VGA), 752 x 480 pixels (WideVGA)	512 pixels, 1024 pixels	1024 pixels/line, 512 pixels/line
<b>Max. no. of inspection programs</b>	256	256	16	48
<b>Frame rate (full image)</b>	27 ... 150 fps	60 ... 150 fps		
<b>Lens mounting</b>	CS mount (C mount with lens protection tube)	integrated lens		
<b>Min. part length</b>			1 mm	3mm
<b>Min. part diameter</b>			0.5 mm	0.5mm
<b>Description</b>	<ul style="list-style-type: none"> <li>• Intelligent field-based camera</li> <li>• For 2D quality inspection, position and rotary orientation sensing, reading of 1D and 2D codes, reading of optical characters (OCR)</li> <li>• Integrated full PLC (CODESYS)</li> <li>• Ethernet and CAN for communicating with higher-level controllers</li> </ul>	<ul style="list-style-type: none"> <li>• Intelligent field-based camera</li> <li>• For 2D quality inspection, position and rotary orientation sensing, reading of 1D and 2D codes, reading of optical characters (OCR)</li> <li>• Integrated full PLC (CODESYS)</li> <li>• Ethernet and CAN for communicating with higher-level controllers</li> </ul>	<ul style="list-style-type: none"> <li>• Intelligent line-scan camera</li> <li>• For orientation recognition and quality inspection of small moving parts</li> <li>• Encoder connection</li> <li>• Teach-in function</li> </ul>	<ul style="list-style-type: none"> <li>• Intelligent, line-scan camera-based vision system</li> <li>• For orientation recognition and quality inspection of small moving parts</li> <li>• Available with conveyor unit and air ejector positions</li> <li>• Available with encoder connection</li> <li>• Teach-in function</li> </ul>
<b>online:</b> →	<a href="#">sboc-q</a>	<a href="#">sboi-q</a>	<a href="#">chb-c</a>	<a href="#">chb</a>


## Software tool

<b>Air consumption</b>		<p>Calculate your system's air consumption quickly and conveniently. Simply enter all the drives and tubing, set the cycle times and working pressure and the air consumption per minute and per day will be calculated for you. It includes a feature for exporting the input table together with the result directly to Excel.</p>	<p>This tool can be found</p> <ul style="list-style-type: none"> <li>• either in the electronic catalogue by clicking on the blue button "Engineering"</li> <li>• or on the DVD under Engineering Tools.</li> </ul>
<b>Configurator</b>		<p>Design a product with numerous features reliably and quickly with the help of the configurator. Select all the required product features step-by-step. The use of logic checks ensures that only correct configurations are available for selection. A dynamic graphic generated on the basis of the configuration provides visual assistance in selecting the correct product features.</p>	<p>The configurator is part of the electronic catalogue and is not available as a separate software program.</p>



## Service unit combinations: MSE series

<p>Type</p>	 <p><b>Service unit combination MSE6</b></p>
<p><b>Pneumatic connection 1</b></p>	<p>G1/2, connecting plate</p>
<p><b>Nominal flow rate</b></p>	<p>4500 l/min</p>
<p><b>Flow measuring range</b></p>	<p>5000 l/min</p>
<p><b>Operating pressure</b></p>	<p>4 ... 10 bar</p>
<p><b>Electrical actuation</b></p>	<p>Bus node for PROFIBUS DP</p>
<p><b>Function</b></p>	<p>Energy saving (2/2-way function DE, V24)</p>
<p><b>Description</b></p>	<ul style="list-style-type: none"> <li>• Intelligent pneumatic service unit for optimising the use of compressed air as energy medium</li> <li>• Equipped with measuring, control and diagnostic functions</li> <li>• Detection of increased compressed air consumption e.g. by leakage</li> <li>• Used as process monitoring module</li> <li>• Width 6</li> <li>• Electrical activation via bus node</li> </ul>
<p><b>online:</b> →</p>	<p><a href="#">mse6</a></p>



## Service unit combinations: MS series

	
Type	Service unit combination <b>MSB4, MSB6, MSB9</b>
Pneumatic connection 1	G1/8, G1/4, G1/2, G3/4, G1, G1 1/4, G1 1/2
Nominal flow rate	550 ... 18000 l/min
Pressure regulation range	0.5 ... 16 bar
Operating pressure	0 ... 20 bar
Grade of filtration	0.01 ... 40 µm
Description	<ul style="list-style-type: none"> <li>• Sizes: 4, 6, 9</li> <li>• Combination of filter regulator MS-LFR, filter MS-LF, fine and micro filter MS-LFM, activated carbon filter MS-LFX, pressure regulator MS-LR, MS-LRB, precision pressure regulator MS-LRP, MS-LRPB, electric pressure regulator MS-LRE, lubricator MS-LOE, on-off valve MS-EM, MS-EE, soft-start valve MS-DL, MS-DE, soft-start/quick exhaust valve MS-SV, membrane air dryer MS-LDM1</li> </ul>
online: →	<a href="#">msb4</a>


## Service unit combinations: D series, metal

		
Type	Service unit combination with lubricator <b>FRC-K</b>	Service unit combination without lubricator <b>LFR-K, LFRS-K</b>
Pneumatic connection 1	G1/8, G1/4, G3/8, G1/2, G3/4	G1/8, G1/4, G3/8, G1/2, G3/4
Nominal flow rate	530 ... 8200 l/min	575 ... 9400 l/min
Pressure regulation range	0.5 ... 12 bar	0.5 ... 12 bar
Operating pressure	1 ... 16 bar	1 ... 16 bar
Grade of filtration	40µm	40µm
Description	<ul style="list-style-type: none"> <li>• Combination of filter regulator LFR, branching module FRM, lubricator LOE, on-off valve HE, HEE, soft-start valve HEL, mounting accessories</li> <li>• Sizes: mini, midi, maxi</li> </ul>	<ul style="list-style-type: none"> <li>• Combination of filter regulator LFR, LFRS, branching module FRM, on-off valve HE, HEE, soft-start valve HEL, mounting accessories</li> <li>• Sizes: mini, midi, maxi</li> </ul>
online: →	<a href="#">frc</a>	<a href="#">lfrs</a>


## Service unit combinations: D series, polymer

		
Type	Service unit combination <b>FRC-DB</b>	Service unit combination <b>LFR-DB</b>
Pneumatic connection 1	G1/4	G1/4
Nominal flow rate	400 ... 700 l/min	1900 l/min
Pressure regulation range	0.5 ... 7 bar	0.5 ... 7 bar
Operating pressure	1.5 ... 10 bar	1.5 ... 10 bar
Grade of filtration	40 µm	40 µm
Description	<ul style="list-style-type: none"> <li>• Combination of on-off valve, filter regulator, distributor module and lubricator</li> <li>• Size: mini</li> </ul>	<ul style="list-style-type: none"> <li>• Combination of on-off valve, filter regulator, distributor module</li> <li>• Size: mini</li> </ul>
online: →	<a href="#">frc</a>	<a href="#">lfr</a>


## Filter regulators/lubricators: MS series

	
Type	Air supply unit <b>MSB4-FRC, MSB6-FRC</b>
Pneumatic connection 1	G1/8, G1/4, G3/8, G1/2
Nominal flow rate	850 ... 4800 l/min
Pressure regulation range	0.3 ... 12 bar
Operating pressure	1.5 ... 20 bar
Grade of filtration	5 ... 40 µm
Description	<ul style="list-style-type: none"> <li>• Sizes: 4, 6</li> <li>• Filter, regulator and lubricator functions in a single unit</li> <li>• High flow rate and highly efficient in removing contaminants</li> <li>• Good regulation characteristics with minimal pressure hysteresis</li> <li>• Setting values are secured by locking the rotary knob</li> </ul>
online: →	<a href="#">msb</a>


## Filter regulators/lubricators: D series, metal

	
Type	Air supply unit FRC, FRCS
Pneumatic connection 1	G1/8, G1/4, G3/8, G1/2, G3/4, G1, M5, M7, QS-4, QS-6
Nominal flow rate	80 ... 8700 l/min
Pressure regulation range	0.5 ... 12 bar
Operating pressure	1 ... 16 bar
Grade of filtration	5 ... 40 µm
Description	<ul style="list-style-type: none"> <li>• Filter, regulator and lubricator functions in a single unit</li> <li>• High flow rate and highly efficient in removing contaminants</li> <li>• Good regulation characteristics with minimal pressure hysteresis</li> <li>• Setting values are secured by locking the rotary knob</li> <li>• Sizes: micro, mini, midi, maxi</li> <li>• Grid dimension: 25, 40, 55, 66 mm</li> </ul>
online: →	<a href="#">frc</a>


## Filter regulators/lubricators: D series, polymer

	
Type	Air supply unit FRC-DB
Pneumatic connection 1	G1/8, G1/4
Nominal flow rate	400 ... 650 l/min
Pressure regulation range	0.5 ... 7 bar
Operating pressure	1.5 ... 10 bar
Grade of filtration	5 ... 40 µm
Description	<ul style="list-style-type: none"> <li>• Filter, regulator and lubricator functions in a single unit</li> <li>• High flow rate and highly efficient in removing contaminants</li> <li>• Good regulation characteristics with minimal pressure hysteresis</li> <li>• Setting values are secured by means of the rotary knob with detent</li> <li>• With manual or semi-automatic condensate drain</li> <li>• Size: mini</li> </ul>
online: →	<a href="#">frc</a>


## Filter regulators: MS series

	
Type	Filter regulator MS4-LFR, MS6-LFR, MS9-LFR, MS12-LFR
Pneumatic connection 1	Connecting plate, G1/8, G1/4, 3/8, G1/2, G3/4, G1
Nominal flow rate	850 ... 23000 l/min
Pressure regulation range	0.3 ... 16 bar
Operating pressure	0.8 ... 20 bar
Grade of filtration	5 ... 40 µm
Description	<ul style="list-style-type: none"> <li>• Good regulation characteristics with minimal hysteresis and primary pressure compensation</li> <li>• Good particle and condensate separation</li> <li>• Available with or without secondary venting</li> <li>• High flow rate</li> <li>• MS4-LFR, MS6-LFR: directly actuated diaphragm regulator, MS9-LFR: piloted or directly actuated filter-diaphragm regulator, MS12-LFR: piloted diaphragm regulator without internal air consumption</li> <li>• Lockable rotary knob</li> <li>• Return flow option for exhausting from output 2 to output 1 already integrated</li> </ul>
online: →	<a href="#">ms4-lfr</a>





## Filter regulators: D series, metal

	
Type	Filter regulator LFR, LFRS
Pneumatic connection 1	G1/8, G1/4, G3/8, G1/2, G3/4, G1, M5, M7, QS-4, QS-6
Nominal flow rate	110 ... 11000 l/min
Pressure regulation range	0.5 ... 12 bar
Operating pressure	1... 16 bar
Grade of filtration	5 ... 40 µm
Description	<ul style="list-style-type: none"> <li>• Space-saving design with filter and regulator in a single unit</li> <li>• Good particle separation and high flow rate</li> <li>• Good regulation characteristics with minimal hysteresis</li> <li>• Two pressure gauge connections for flexible installation</li> <li>• Setting values are secured by locking the rotary knob</li> <li>• With manual, semi-automatic or fully automatic condensate drain</li> <li>• Lockable rotary knob</li> </ul>
online: →	<a href="#">lfr</a>





### Filter regulators: D series, polymer

	
Type	Filter regulator LFR-DB
Pneumatic connection 1	G1/8, G1/4
Nominal flow rate	500 ... 1200 l/min
Pressure regulation range	0.5 ... 7 bar
Operating pressure	1.5... 10 bar
Grade of filtration	5 ... 40 µm
Description	<ul style="list-style-type: none"> <li>• Space-saving design with filter and regulator in a single unit</li> <li>• Good particle separation and high flow rate</li> <li>• Good regulation characteristics with minimal hysteresis</li> <li>• With manual or semi-automatic condensate drain</li> <li>• Setting values are secured by locking the rotary knob</li> </ul>
online: →	<a href="#">lfr</a>


### Filters: MS series

				
Type	Filterfilter MS4-LF, MS6-LF, MS9-LF, MS12-LF	Fine filter MS4-LFM-B, MS6-LFM-B, MS9- LFM-B, MS12-LFM-B	Micro filter MS4-LFM-A, MS6-LFM-A, MS9- LFM-A, MS12-LFM-A	Activated carbon filter MS4-LFX, MS6-LFX, MS9-LFX, MS12-LFX
Pneumatic connection 1	Connecting plate, G1/8, G1/4, 3/8, G1/2, G3/4, G1	Connecting plate, G1/8, G1/4, 3/8, G1/2, G3/4, G1	Connecting plate, G1/8, G1/4, 3/8, G1/2, G3/4, G1	Connecting plate, G1/8, G1/4, 3/8, G1/2, G3/4, G1
Nominal flow rate	1000 ... 16000 l/min	120 ... 7600 l/min	120 ... 7000 l/min	250 ... 6000 l/min
Operating pressure	0 ... 20 bar	0 ... 20 bar	0 ... 20 bar	0 ... 20 bar
Grade of filtration	5 ... 40 µm	1 µm	0.01 µm	
Description	<ul style="list-style-type: none"> <li>• Good particle and condensate separation</li> <li>• High flow rate with minimal pressure drop</li> <li>• Available with manual, semi-automatic, fully automatic or fully automatic, electrically actuated condensate drain</li> </ul>	<ul style="list-style-type: none"> <li>• High-efficiency filter for exceptionally clean compressed air</li> <li>• Air quality to ISO 8573-1</li> <li>• Available with differential pressure indicator for indication of contamination</li> <li>• Available with electronic filter pollution indicator</li> </ul>	<ul style="list-style-type: none"> <li>• High-efficiency filter for exceptionally clean compressed air</li> <li>• Air quality to ISO 8573-1</li> <li>• Available with differential pressure indicator for indication of contamination</li> <li>• Available with electronic filter pollution indicator</li> </ul>	<ul style="list-style-type: none"> <li>• Removal of liquid and gaseous oil particles from compressed air using activated carbon</li> <li>• Eliminates odours and vapours</li> </ul>
online: →	<a href="#">ms4-lf</a>	<a href="#">ms4-lfm-b</a>	<a href="#">ms4-lfm-a</a>	<a href="#">ms4-lfx</a>

## Filters: D series, metal


Type	 Filterfilter LF	 Micro filter LFMA	 Fine filter LFMB	 Fine filter combination LFMB
<b>Pneumatic connection 1</b>	Connecting plate, G1/8, G1/4, G3/8, G1/2, G3/4, G1, M5, M7, QS-4, QS-6	Connecting plate, G1/8, G1/4, G3/8, G1/2, G3/4, G1	Connecting plate, G1/8, G1/4, G3/8, G1/2, G3/4, G1	G1/8, G1/4, G3/8, G1/2, G3/4, G1
<b>Nominal flow rate</b>	170 ... 5300 l/min	130 ... 950 l/min	250 ... 1250 l/min	125 ... 600 l/min
<b>Operating pressure</b>	0 ... 16 bar	1 ... 16 bar	1 ... 16 bar	1 ... 16 bar
<b>Grade of filtration</b>	5 ... 40 µm	0.01µm	1µm	0.01µm
<b>Description</b>	<ul style="list-style-type: none"> <li>• Good particle and condensate separation</li> <li>• High flow rate with minimal pressure drop</li> <li>• With manual or fully automatic condensate drain</li> </ul>	<ul style="list-style-type: none"> <li>• High-efficiency filter for special requirements</li> <li>• Air quality to ISO 8573-1</li> <li>• Version with differential pressure indicator for visual indication of filter contamination</li> </ul>	<ul style="list-style-type: none"> <li>• High-efficiency filter for special requirements</li> <li>• Air quality to ISO 8573-1</li> <li>• Version with differential pressure indicator for visual indication of filter contamination</li> </ul>	<ul style="list-style-type: none"> <li>• High-efficiency filter for special requirements</li> <li>• Air quality to ISO 8573-1</li> <li>• Available as pre-assembled filter combination</li> <li>• Version with differential pressure indicator for visual indication of filter contamination</li> </ul>
<b>online:</b> →	<a href="#">lf</a>	<a href="#">lfma</a>	<a href="#">lfmb</a>	<a href="#">lfmba</a>

## Filters: D series, metal





Type	 Activated carbon filter LFX
<b>Pneumatic connection 1</b>	Connecting plate, G1/8, G1/4, G3/8, G1/2, G3/4, G1
<b>Nominal flow rate</b>	300 ... 1430 l/min
<b>Operating pressure</b>	0 ... 16 bar
<b>Grade of filtration</b>	
<b>Description</b>	<ul style="list-style-type: none"> <li>• Removal of liquid and gaseous oil particles from compressed air using activated carbon</li> <li>• Activated carbon filter cartridges provide odour and oil-free air to food industry standard</li> <li>• Residual oil content ≤0.003 mg/m<sup>3</sup></li> <li>• Air quality class at the output 1.7.1 to ISO 8573-1</li> </ul>
<b>online:</b> →	<a href="#">lfx</a>




### Filters: Individual devices

	
Type	<b>Filter silencer</b> LFU
Size	G1/4, G3/8, G1/2, G1
Grade of filtration	1µm
Operating pressure	0 ... 16 bar
Flow rate with respect to atmosphere	4000 ... 12500 l/min
Noise reduction	Reduction by 40 dB
Description	<ul style="list-style-type: none"> <li>Removes up to 99.99% of oil and other contaminants from exhaust air</li> <li>Manual rotary condensate drain</li> <li>Exhaust noise reduced regardless of frequency</li> </ul>
online: →	<a href="#">lfu</a>




### Regulators: MS series

				
Type	<b>Pressure regulator</b> MS4-LR, MS6-LR, MS9-LR	<b>Pressure regulator</b> MS12-LR	<b>Pressure regulator</b> MS4-LRB, MS6-LRB	<b>Precision pressure regulator</b> MS6-LRP, MS6-LRPB
Pneumatic connection 1	Connecting plate, G1/8, G1/4, 3/8, G1/2, G3/4, G1	Connecting plate	Connecting plate, G1/4, G1/2	Connecting plate, G1/4, G3/8, G1/2
Nominal flow rate	1000 ... 33000 l/min	12000 ... 22000 l/min	300 ... 7300 l/min	800 ... 5000 l/min
Pressure regulation range	0.3 ... 16 bar	0.15 ... 16 bar	0.3 ... 16 bar	0.05 ... 12 bar
Operating pressure	0.8 ... 20 bar	0.8 ... 21 bar	0.8 ... 20 bar	1 ... 14 bar
Max. pressure hysteresis	0.25 ... 0.4 bar	0.04 ... 0.4 bar	0.25bar	0.02bar
Description	<ul style="list-style-type: none"> <li>Good regulation characteristics with minimal hysteresis and primary pressure compensation</li> <li>High flow rate with minimal pressure drop</li> <li>Available with secondary venting</li> <li>Lockable rotary knob</li> <li>With pressure sensor with display and rotary knob pressure gauge</li> <li>Sizes: 4, 6, 9</li> <li>Grid dimension 40, 62, 90 mm</li> </ul>	<ul style="list-style-type: none"> <li>Good regulation characteristics with minimal hysteresis and primary pressure compensation</li> <li>High flow rate with minimal pressure drop</li> <li>Actuator lock to protect set values against adjustment</li> <li>With secondary venting</li> <li>Pressure gauge connection for different fitting options</li> <li>Size: 12</li> <li>Grid dimension 124 mm</li> <li>MS12-LR-...-PO: pneumatically actuated (pressure range determined by means of pilot regulator)</li> <li>MS12-LR-...-PE6: electrically actuated (pilot control by proportional pressure regulator)</li> </ul>	<ul style="list-style-type: none"> <li>For manifold assembly with through air supply</li> <li>For configuring a regulator manifold with independent pressure regulation ranges</li> <li>Good regulation characteristics with minimal hysteresis and primary pressure compensation</li> <li>Actuator lock to protect set values against adjustment</li> <li>With and without secondary venting</li> <li>Integrated return flow option for exhausting from output 2 to output 1</li> <li>Optional pressure sensor</li> <li>Optional rotary knob pressure gauge</li> </ul>	<ul style="list-style-type: none"> <li>As individual device and for manifold assembly</li> <li>Manifold assembly with through air supply</li> <li>Good regulation characteristics with minimal hysteresis and primary pressure compensation</li> <li>Actuator lock to protect set values against adjustment</li> <li>Available with pressure sensor with display</li> <li>Width 6</li> <li>Grid dimension 62 mm</li> </ul>
online: →	<a href="#">ms4-lr</a>	<a href="#">ms12-lr</a>	<a href="#">ms4-lrb</a>	<a href="#">ms6-lrp</a>



## Regulators: MS series

	
Type	Electrical pressure regulator MS6-LRE
Pneumatic connection 1	Connecting plate, G1/4, G3/8, G1/2
Nominal flow rate	2200 ... 7500 l/min
Pressure regulation range	0.3 ... 16 bar
Operating pressure	0.8 ... 20 bar
Max. pressure hysteresis	0.25bar
Description	<ul style="list-style-type: none"> <li>• With integrated electric drive unit for indirectly setting the output pressure</li> <li>• Constant output pressure even in the event of a power failure thanks to the fail-safe function</li> <li>• Available with control unit with display</li> <li>• Available with integrated pressure sensor with electrical output</li> <li>• With or without secondary venting</li> <li>• Width 6</li> <li>• Grid dimension 62 mm</li> </ul>
online: →	<a href="#">ms6-lre</a>


## Regulators: D series, metal

			
Type	Pressure regulator LR, LRS	Pressure regulator LRB, LRBS	Pressure regulator combination LRB-K
Pneumatic connection 1	G1/8, G1/4, G3/8, G1/2, G3/4, G1, M5, M7, QS-4, QS-6	Connecting plate	G1/4, G3/8, G1/2
Nominal flow rate	120 ... 12500 l/min	1600 ... 3800 l/min	1000 ... 3800 l/min
Pressure regulation range	0.5 ... 12 bar	0.5 ... 12 bar	0.5 ... 12 bar
Operating pressure	0 ... 20 bar	1 ... 16 bar	1 ... 16 bar
Max. pressure hysteresis	0.2 ... 0.5 bar	0.2bar	0.2 ... 0.5 bar
Description	<ul style="list-style-type: none"> <li>• Suitable for front panel mounting</li> <li>• Lockable design</li> <li>• Two pressure gauge connections for different fitting options</li> <li>• Mini, midi size: directly actuated diaphragm regulator</li> <li>• Maxi size: piloted piston regulator, diaphragm regulator LRS-DI</li> <li>• Good regulation characteristics with minimal pressure hysteresis</li> <li>• High flow rate</li> <li>• Return flow option for venting from output 2 to input 1</li> <li>• Available with pressure gauge</li> <li>• Sizes: micro, mini, midi, maxi</li> </ul>	<ul style="list-style-type: none"> <li>• Manifold assembly with through air supply</li> <li>• Lockable design</li> <li>• Good regulation characteristics with minimal hysteresis and primary pressure compensation</li> <li>• For configuring a regulator manifold with independent pressure ranges</li> <li>• Settings secured via detent on rotary knob and push-in adjustment lock</li> <li>• Directly actuated diaphragm regulator</li> <li>• Without pressure gauge</li> <li>• Sizes: mini, midi</li> </ul>	<ul style="list-style-type: none"> <li>• With through air supply</li> <li>• Regulator manifold with independent pressure ranges</li> <li>• Good regulation characteristics with minimal hysteresis and primary pressure compensation</li> <li>• Settings secured via detent on rotary knob and push-in adjustment lock</li> <li>• Directly actuated diaphragm regulator</li> <li>• Without pressure gauge</li> <li>• Sizes: mini, midi</li> </ul>
online: →	<a href="#">lrs</a>	<a href="#">lrb-d</a>	<a href="#">lrb-k</a>


## Regulators: D series, polymer

Type	 <b>Pressure regulator</b> LR-DB	 <b>Pressure regulator combination</b> LRB-DB
Pneumatic connection 1	G1/8, G1/4	G1/2
Nominal flow rate	≥1300 l/min	≥1000 l/min
Pressure regulation range	0.5 ... 7 bar	0.5 ... 7 bar
Operating pressure	1.5 ... 10 bar	0 ... 16 bar
Max. pressure hysteresis	0.5 bar	0.5 bar
Description	<ul style="list-style-type: none"> <li>• High flow rate</li> <li>• Good regulation characteristics with minimal pressure hysteresis</li> <li>• Setting values are secured by locking the rotary knob</li> <li>• Available with pressure gauge</li> <li>• Size: mini</li> </ul>	<ul style="list-style-type: none"> <li>• With through air supply</li> <li>• Good regulation characteristics with minimal hysteresis and primary pressure compensation</li> <li>• Regulator manifold with independent pressure ranges</li> <li>• Setting values are secured by locking the rotary knob</li> <li>• Without pressure gauge</li> <li>• Size: mini</li> </ul>
online: →	<a href="#">lr-db</a>	<a href="#">lrb-db</a>


## Regulators: Individual devices

Type	 <b>Precision pressure regulator</b> LRP, LRPS
Pneumatic connection 1	G1/4
Nominal flow rate	800 ... 2300 l/min
Pressure regulation range	0.05 ... 10 bar
Operating pressure	1 ... 12 bar
Max. pressure hysteresis	0.02bar
Description	<ul style="list-style-type: none"> <li>• Lockable design</li> <li>• Precision pressure adjustment possible both in static and dynamic applications</li> <li>• Good response characteristics during rapid modification of supply pressure and flow rate</li> <li>• Supply pressure fluctuations are almost entirely compensated</li> </ul>
online: →	<a href="#">lrp</a>





## Lubricators: MS series

	
Type	Lubricator MS4-LOE, MS6-LOE, MS9-LOE, MS12-LOE
Pneumatic connection 1	Connecting plate, G1/8, G1/4, 3/8, G1/2, G3/4, G1
Nominal flow rate	1100 ... 27000 l/min
Operating pressure	1 ... 16 bar
Minimum flow rate for lubricator function	40 ... 400 l/min
Description	<ul style="list-style-type: none"> <li>• Configurable proportional lubricator with precision oil metering</li> <li>• Quick and easy oil top-up even under pressure</li> <li>• Choice of flow direction: left-right, right-left</li> <li>• Oil capacity 30 ... 1500 cm<sup>3</sup></li> <li>• Sizes: 4, 6, 9, 12</li> <li>• Grid dimension 40, 60, 90, 124 mm</li> </ul>
online: →	<a href="#">ms4-loe</a>



## Lubricators: D series

	
Type	Lubricator LOE
Pneumatic connection 1	G1/8, G1/4, G3/8, G1/2, G3/4, G1, M5, M7, QS-4, QS-6
Nominal flow rate	160 ... 9000 l/min
Operating pressure	0 ... 16 bar
Minimum flow rate for lubricator function	3 ... 10 l/min
Description	<ul style="list-style-type: none"> <li>• Proportional lubricator with precision oil metering</li> <li>• Quick and easy top-up even under pressure</li> <li>• High flow rate</li> <li>• Sturdy metal housing and transparent lubricator bowl with metal bowl guard</li> <li>• Oil capacity 6.5 ... 190 cm<sup>3</sup></li> <li>• Sizes: micro, mini, midi, maxi</li> <li>• Grid dimension 25, 40, 55, 66 mm</li> </ul>
online: →	<a href="#">loe</a>





## On-off and soft-start valves: MS series

Type	 <b>On-off valve</b> MS4-EM1, MS6-EM1, MS9-EM, MS12-EM	 <b>On-off valve</b> MS4-EE, MS6-EE, MS9-EE, MS12-EE	 <b>Soft-start valve</b> MS4-DL, MS6-DL, MS12-DL	 <b>Soft-start valve</b> MS4-DE, MS6-DE, MS12-DE
<b>Pneumatic connection 1</b>	Connecting plate, G1/8, G1/4, G3/8, G1/2	Connecting plate, G1/8, G1/4, G3/8, G1/2	Connecting plate, G1/8, G1/4, G3/8, G1/2	Connecting plate, G1/8, G1/4, G3/8, G1/2
<b>Nominal flow rate</b>	1200 ... 32000 l/min	1000 ... 32000 l/min	1000 ... 42000 l/min	1000 ... 42000 l/min
<b>Operating pressure</b>	0 ... 20 bar	3 ... 18 bar	2 ... 20 bar	3 ... 18 bar
<b>Type of actuation</b>	Manual	electrical	pneumatic	electrical
<b>Description</b>	<ul style="list-style-type: none"> <li>A silencer can be attached or the exhaust air can be ducted at port 3</li> <li>Available with pressure gauge and pressure sensor with display</li> <li>Sizes: 4, 6, 9, 12</li> <li>Grid dimension 40, 62, 90, 124 mm</li> </ul>	<ul style="list-style-type: none"> <li>Supply voltage 24 V DC, 110, 230 V AC</li> <li>Available with pressure sensor with display</li> <li>With solenoid coil, without plug socket</li> <li>Sizes: 4, 6, 9, 12</li> <li>Grid dimension 40, 62, 90, 124 mm</li> </ul>	<ul style="list-style-type: none"> <li>For slowly pressurising and venting pneumatic installations (for use with on-off valves EM1 and EE)</li> <li>For advancing the drives slowly and reliably into the initial position</li> <li>For avoiding sudden and unexpected movements</li> <li>Adjustable switching time delay</li> <li>Sizes: 4, 6, 12</li> <li>Grid dimension 40, 62, 124 mm</li> </ul>	<ul style="list-style-type: none"> <li>Supply voltage 24 V DC, 110, 230 V AC</li> <li>For slowly pressurising and venting pneumatic installations</li> <li>For advancing the drives slowly and reliably into the initial position</li> <li>For avoiding sudden and unexpected movements</li> <li>Adjustable switching time delay</li> <li>Sizes: 4, 6, 12</li> <li>Grid dimension 40, 62, 124 mm</li> </ul>
<b>online:</b> →	<a href="#">ms4-em</a>	<a href="#">ms4-ee</a>	<a href="#">ms4-dl</a>	<a href="#">ms4-de</a>



## On-off and soft-start valves: MS series

Type	 <b>Soft-start and quick exhaust valve</b> MS6-SV-E	 <b>Soft-start and quick exhaust valve</b> MS6-SV-C, MS9-SV-C
<b>Pneumatic connection 1</b>	Connecting plate, G1/2	Connecting plate, G1/2, G3/4, G1
<b>Nominal flow rate</b>	4300 l/min	5700 l/min, 14150 ... 16460 l/min
<b>Operating pressure</b>	3.5 ... 10 bar	3 ... 18 bar, 3.5 ... 16 bar
<b>Type of actuation</b>	electrical	electrical
<b>Description</b>	<ul style="list-style-type: none"> <li>Performance level: category 4, 2-channel with self-monitoring, to EN ISO 13849-1</li> <li>SIL 3</li> <li>For reducing pressure quickly and reliably and for building up pressure gradually</li> <li>Switching time delay adjustable via a flow control valve for gradual pressure build-up</li> <li>Available with silencer</li> <li>Supply voltage 24 V DC</li> <li>Width 6</li> <li>Grid dimension 62 mm</li> </ul>	<ul style="list-style-type: none"> <li>Performance level: category 1, to EN ISO 13849-1</li> <li>For reducing pressure quickly and reliably and for building up pressure gradually</li> <li>Switching time delay adjustable via a flow control valve for gradual pressure build-up</li> <li>Supply voltage 24 V DC</li> <li>Size 6, 9</li> <li>Grid dimension 62, 90 mm</li> </ul>
<b>online:</b> →	<a href="#">ms6-sv</a>	<a href="#">ms6-sv-c</a>


## On-off and soft-start valves: D series

Type	 On-off valve HE	 On-off valve HEE	 On-off valve HEP	 Soft-start valve HEL
<b>Pneumatic connection 1</b>	G1/8, G1/4, G3/8, G1/2, G3/4, G1	G1/8, G1/4, G3/8, G1/2, G3/4, G1	G1/8, G1/4, G3/8, G1/2, G3/4, G1	G1/8, G1/4, G3/8, G1/2, G3/4, G1
<b>Nominal flow rate</b>	1000 ... 10000 l/min	1000 ... 6500 l/min	1000 ... 6500 l/min	1000 ... 6500 l/min
<b>Operating pressure</b>	0 ... 16 bar	2.5 ... 16 bar	0 ... 16 bar	3 ... 16 bar
<b>Type of actuation</b>	Manual	electrical	pneumatic	pneumatic
<b>Description</b>	<ul style="list-style-type: none"> <li>• 3/2-way valve</li> <li>• Ducted exhaust air possible via a threaded connection</li> <li>• The switching position is immediately recognisable</li> <li>• Sizes: mini, midi, maxi</li> <li>• Grid dimension 40, 55, 66 mm</li> </ul>	<ul style="list-style-type: none"> <li>• For pressurising and venting pneumatic installations</li> <li>• With solenoid coil, without plug socket</li> <li>• Solenoid head can be repositioned by 4 x 90°</li> <li>• Detenting and non-detenting manual override</li> <li>• Supply voltage 24 V DC, 110, 230 V AC</li> <li>• Sizes: mini, midi, maxi</li> <li>• Grid dimension 40, 55, 66 mm</li> </ul>	<ul style="list-style-type: none"> <li>• On-off valve for pressurising and venting pneumatic installations</li> <li>• As an individual device or in combination with other D series modules</li> <li>• Especially suitable for applications requiring explosion protection</li> <li>• Sizes: mini, midi, maxi</li> <li>• Grid dimension 40, 55, 66 mm</li> </ul>	<ul style="list-style-type: none"> <li>• For gradual pressure build-up (for use with on-off valves HE and HEE)</li> <li>• For advancing drives slowly and reliably into the initial position</li> <li>• For avoiding sudden and unexpected movements</li> <li>• Adjustable switching time delay</li> <li>• Sizes: mini, midi, maxi</li> <li>• Grid dimension 40, 55, 66 mm</li> </ul>
<b>online:</b> →	<a href="#">he-d</a>	<a href="#">hee-d</a>	<a href="#">hep</a>	<a href="#">hel</a>


## On-off and soft-start valves: Individual devices

Type	 Shut-off valve HE-LO	 Solenoid valve, pneumatic valve MFHE, VLHE
<b>Pneumatic connection 1</b>	G3/8, G1/2, G3/4, G1	G1/4, G3/8, G1/2
<b>Nominal flow rate</b>	15000 ... 10000 l/min	1200 ... 2900 l/min
<b>Operating pressure</b>	1... 10 bar	2 ... 12 bar
<b>Type of actuation</b>	Manual	electrical, pneumatic
<b>Description</b>	<ul style="list-style-type: none"> <li>• To safety standard</li> <li>• For shutting off the compressed air supply whilst simultaneously exhausting systems powered by compressed air</li> <li>• Can be locked in the closed position</li> <li>• Screwed into piping, through-holes for wall mounting</li> </ul>	<ul style="list-style-type: none"> <li>• For F-solenoid coils</li> <li>• Piloted</li> <li>• On-off valve in combination with service units</li> <li>• Soft-start valve</li> <li>• Manual override, detenting</li> </ul>
<b>online:</b> →	<a href="#">he-lo</a>	<a href="#">mfhe</a>


## Air dryers: MS series

	
Type	<b>Membrane air dryer</b> <b>MS4-LDM1, MS6-LDM1</b>
Pneumatic connection 1	Connecting plate, G1/8, G1/4, G3/8, G1/2
Nominal flow rate	50 ... 400 l/min
Operating pressure	3 ... 12.5 bar
Pressure dew point reduction	20 K
Description	<ul style="list-style-type: none"> <li>• Final dryer with excellent operational reliability</li> <li>• Suitable for use as an individual device or for integration into existing service unit combinations</li> <li>• Flow rate-dependent dew point reduction</li> <li>• Wear-free function requiring no external energy</li> <li>• Sizes: 4, 6</li> <li>• Grid dimension 40, 62 mm</li> </ul>
online: →	<a href="#">ms4-ldm1</a>



## Air dryers: D series

	
Type	<b>Membrane air dryer</b> <b>LDM1</b>
Pneumatic connection 1	G1/2, G3/4, G1
Nominal flow rate	300 ... 1000 l/min
Operating pressure	3 ... 12.5 bar
Pressure dew point reduction	17 ... 20 K
Description	<ul style="list-style-type: none"> <li>• Final dryer with excellent operational reliability</li> <li>• Flow rate-dependent dew point reduction</li> <li>• Wear-free function requiring no external energy</li> <li>• Size: maxi</li> <li>• Grid dimension 66 mm</li> <li>• Individual device with or without connecting plates, for service unit combination</li> </ul>
online: →	<a href="#">ldm1</a>

## Air dryers: Individual devices



	
Type	Adsorption dryer PDAD
Pneumatic connection 1	G3/8, G1/2
Nominal flow rate	10 ... 1000 l/min
Supply pressure 1	4 ... 16 bar
Pressure dew point	-40°C or -70°C
Description	<ul style="list-style-type: none"> <li>• Ideal for decentralised compressed air drying</li> <li>• Extends the service life of pneumatic components</li> <li>• Additional filtering of oil and particulates</li> <li>• Defined pressure dew point</li> <li>• High flow rate</li> <li>• Low purge air consumption and noise levels</li> </ul>
online: →	<a href="#">pdad</a>

## Compressed air distribution units: MS series




		
Type	Branching module MS4-FRM, MS6-FRM, MS9-FRM, MS12-FRM	Distributor block MS4-FRM-FRZ, MS6-FRM-FRZ
Pneumatic connection 1	Connecting plate, G1/8, G1/4, 3/8, G1/2, G3/4, G1	G1/4, G1/2
Standard nominal flow rate in main flow direction 1->2	1200 ... 50000 l/min	4050 ... 14600 l/min
Operating pressure	0 ... 20 bar	0 ... 20 bar
Description	<ul style="list-style-type: none"> <li>• Designs with integrated non-return function, with pressure switch</li> <li>• Pneumatic manifold with 4 connections</li> <li>• Can be used as an intermediate distributor for varying air qualities</li> <li>• Outlet at top and bottom</li> <li>• Available with pressure sensor with display</li> <li>• Sizes: 4, 6, 9, 12</li> <li>• Grid dimension 40, 62, 90, 124 mm</li> </ul>	<ul style="list-style-type: none"> <li>• Pneumatic manifold with 4 connections</li> <li>• Outlet at top and bottom</li> <li>• Can be used as an intermediate distributor for varying air qualities</li> <li>• Can be used as an adapter between two pressure regulators with large rotary knob with pressure gauge on size MS4</li> <li>• Sizes: 4, 6</li> <li>• Grid dimension 20, 31 mm</li> </ul>
online: →	<a href="#">ms*-frm</a>	<a href="#">ms*-frm-frz</a>




## Compressed air distribution units: D series

		
Type	<b>Branching module</b> FRM	<b>Distributor block</b> FRZ
Pneumatic connection 1	G1/8, G1/4, G3/8, G1/2, G3/4, G1	Manifold module
Standard nominal flow rate in main flow direction 1->2	1100 ... 20000 l/min	
Operating pressure	0 ... 16 bar	
Description	<ul style="list-style-type: none"> <li>• Designs with integrated non-return function, with pressure switch</li> <li>• Several additional air connections for greater flexibility</li> <li>• Can be used as an intermediate distributor for varying air qualities</li> <li>• Sizes: mini, midi, maxi</li> <li>• Grid dimension 40, 55, 66 mm</li> </ul>	<ul style="list-style-type: none"> <li>• Sizes: micro, mini, midi, maxi</li> <li>• Grid dimension 25, 40, 55, 66 mm</li> <li>• Several additional air connections for greater flexibility</li> </ul>
online: →	<a href="#">frm</a>	<a href="#">fz</a>





## Condensate drain

			
Type	<b>Water separator</b> MS6-LWS, MS9-LWS, MS12-LWS	<b>Condensate drain</b> PWEA	<b>Condensate drain</b> WA
Pneumatic connection		G1/2	M9
Pneumatic connection 1	Connecting plate, G1/4, G3/8, G1/2, G3/4, G1		
Operating pressure	0.8 ... 16 bar	0.8 ... 16 bar	0 ... 16 bar
Description	<ul style="list-style-type: none"> <li>• Maintenance-free</li> <li>• Constantly high condensate separation (99%) up to the maximum flow rate</li> <li>• Metal bowl</li> <li>• Available with fully automatic or fully automatic, electrically actuated condensate drain</li> </ul>	<ul style="list-style-type: none"> <li>• Fully automatic condensate drain with independent electrical controller</li> <li>• Interface for communicating with master control device</li> <li>• Reliable thanks to non-contacting capacitive sensor</li> <li>• Can be used with service units or simply in piping systems</li> <li>• Ready status and switching status indicated via LEDs and electrical interface</li> </ul>	<ul style="list-style-type: none"> <li>• For attachment to service units and compressed air networks/systems</li> <li>• Automatic emptying after the max. fill level has been reached</li> <li>• Automatic emptying after the operating pressure <math>p &lt; 0.5</math> bar is switched off</li> <li>• Manual actuation during operation is possible</li> </ul>
online: →	<a href="#">ms6-lws</a>	<a href="#">pwea</a>	<a href="#">wa</a>



## Pressure boosters

	
<b>Type</b>	<b>Pressure booster DPA</b>
<b>Pneumatic connection 1</b>	G1/4, G3/8, G1/2
<b>Output pressure 2</b>	4 ... 16 bar
<b>Supply pressure 1</b>	2 ... 10 bar
<b>Description</b>	<ul style="list-style-type: none"> <li>• Minimal loss of volume due to valve activation</li> <li>• Designed as a pressure booster/air reservoir combination</li> <li>• Any mounting position</li> <li>• Short filling times</li> <li>• Long service life</li> <li>• Compact design</li> <li>• Available with sensing option</li> </ul>
<b>online:</b> →	<a href="#">dpa</a>

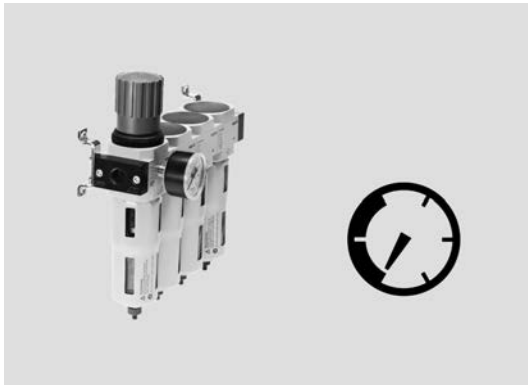
## Pressure indicators

				
<b>Type</b>	<b>Pressure gauge PAGN</b>	<b>Pressure gauge MA</b>	<b>Flanged pressure gauge FMA</b>	<b>Flanged precision pressure gauge, precision pressure gauge FMAP, MAP</b>
<b>Type of mounting</b>	In-line installation in-line installation	In-line installation in-line installation	front panel mounting	front panel mounting, In-line installation in-line installation
<b>Indicating range</b>	0 ... 16 bar	0 ... 25 bar	0 ... 16 bar	0 ... 16 bar
<b>Pneumatic connection</b>	QSP...10	G1/8, G1/4, M5, QS-4, QS-6, QS-8, R1/8, R1/4	G1/4	G1/4, R1/8
<b>Operating pressure</b>	0 ... 16 bar	0 ... 25 bar	0 ... 16 bar	0 ... 16 bar
<b>Measurement accuracy class</b>	2.5, 4	1.6, 2.5, 4, 5	1.6, 2.5	1, 1.6
<b>Description</b>	<ul style="list-style-type: none"> <li>• Display units bar, psi</li> <li>• Pneumatic connection via QSP-10</li> <li>• Mounting via retaining clamp</li> </ul>	<ul style="list-style-type: none"> <li>• Designs based on DIN EN 837-1, available with red-green range</li> <li>• Pneumatic connection via R, metric or G thread, push-in connector</li> <li>• Display units bar, psi, MPa</li> </ul>	<ul style="list-style-type: none"> <li>• Design to DIN EN 837-1</li> <li>• Pneumatic connection via G thread</li> <li>• front panel mounting</li> <li>• Display units bar, psi</li> </ul>	<ul style="list-style-type: none"> <li>• Conforms to EN 837-1</li> <li>• Display units bar, psi</li> <li>• Connection via G thread or R thread</li> </ul>
<b>online:</b> →	<a href="#">pagn</a>	<a href="#">ma</a>	<a href="#">fma</a>	<a href="#">fmap</a>

## Pressure indicators

Type	 <p><b>Pressure gauge kit</b> DPA-MA-SET</p>	 <p><b>Vacuum gauge</b> VAM, FVAM</p>
Type of mounting	with male thread	front panel mounting, screw-in
Indicating range		-1bar, -1 ... +9 bar
Pneumatic connection	G1/8, G1/4, R1/8	G1/8, G1/4, R1/8, R1/4
Operating pressure	10 ... 16 bar	-1bar, -1 ... +9 bar
Measurement accuracy class	2.5, 4	2.5
Description	<ul style="list-style-type: none"> <li>• For pressure booster DPA</li> <li>• For monitoring the supply and output pressure</li> <li>• Pneumatic connection via R, G thread</li> </ul>	<ul style="list-style-type: none"> <li>• Designs based on standard DIN EN 837-1, available with red-green range</li> <li>• Pneumatic connection via R, G thread</li> <li>• Screw-in or front panel mounting</li> <li>• Double or single scale</li> <li>• Display units bar, inHg, psi</li> </ul>
online: →	<a href="#">dpa*set</a>	<a href="#">vam</a>

## Customised components – for your specific requirements



### Components for compressed air preparation with customised designs


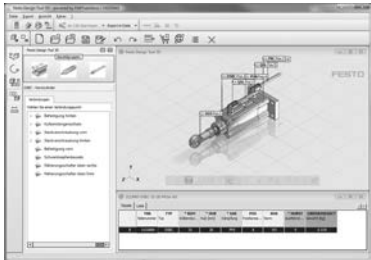
Can't find the compressed air preparation components you need in our catalogue? We can offer you customised components that are tailored to your specific requirements – from minor product modifications to complete new product developments.

Common product modifications:





- Modified pressure range
- Rotary knob: in a special colour, with protection against rotation
- Fitting: integrated throttling port, special thread
- Tubing with special printing
- Pressure gauge with red/green range

Many additional variants are possible. Ask your Festo sales engineer, who will be happy to help. Further information on customised components can be found on your local website at [www.festo.com](http://www.festo.com)





## Software tool

<p><b>Product finder for tubing</b></p> 	<p>Simply enter parameters such as working pressure, chemicals and required resistance to cleaning agents and have the program calculate the right tubing for your application.</p>	<p>This tool can be found</p> <ul style="list-style-type: none"> <li>• either in the electronic catalogue by clicking on the blue button "Product finder"</li> <li>• or on the DVD under Engineering Tools.</li> </ul>
<p><b>Festo Design Tool 3D FDT 3D</b></p> 	<p>The Festo Design Tool 3D is a 3D product configurator for generating specific CAD product combinations from Festo. This configurator makes your search for the right accessory easier, more reliable and faster.</p> <p>You can then order the module that has been created with a single order code – either completely pre-assembled or as individual parts in a single box. As a result, your bill of materials is considerably shortened and downstream processes such as product ordering, order picking and assembly are significantly simplified.</p>	<p>All ordering options are available in the following countries: IT, IE, TR, DK, SE, NO, NL, FI, FR, DE, BE, CH, ES, GB, ZA, AT, SK, PL, CZ, HU, SI, RU.</p> <p>This tool can be found</p> <ul style="list-style-type: none"> <li>• either via the address: <a href="http://www.festo.com/FDT-3D">www.festo.com/FDT-3D</a> in the countries listed above,</li> <li>• or on the CD "FDT 3D" (part no. 135595 for the countries listed above)</li> <li>• or on the DVD.</li> </ul>




## Standard O.D. tubing

Type	 Plastic tubing, DUO tubing PUN, PUN-DUO	 Plastic tubing, DUO tubing PUN-H, PUN-H-DUO	 Plastic tubing PUN-CM	 Plastic tubing PUN-V0
<b>O.D.</b>	3 ... 16 mm	2 ... 16 mm	4 ... 12 mm	4 ... 16 mm
<b>I.D.</b>	2.1 ... 11 mm	1.2 ... 11 mm	2.5 ... 8 mm	2 ... 11.8 mm
<b>Temperature-dependent operating pressure</b>	-0.95 ... +10 bar	-0.95 ... +10 bar	-0.95 ... +10 bar	-0.95 ... +10 bar
<b>Ambient temperature</b>	-35 ... +60 °C	-35 ... +60 °C	-35 ... +60 °C	-35 ... +60 °C
<b>Description</b>	<ul style="list-style-type: none"> <li>• Highly flexible plastic tubing</li> <li>• Polyurethane</li> <li>• RoHS compliant</li> <li>• Operating medium: compressed air, vacuum</li> <li>• Suitable for use with energy chains</li> <li>• High resistance to stress cracks</li> <li>• Also in the form of DUO plastic tubing</li> </ul>	<ul style="list-style-type: none"> <li>• Polyurethane</li> <li>• Also in the form of DUO plastic tubing</li> <li>• Operating medium: compressed air, vacuum</li> <li>• Approved for use in the food industry</li> <li>• High resistance to microbes and hydrolysis</li> <li>• Suitable for use with energy chains</li> <li>• Suitable for use with water as an operating medium</li> </ul>	<ul style="list-style-type: none"> <li>• Highly flexible plastic tubing, antistatic, electrically conductive</li> <li>• Polyurethane</li> <li>• Operating medium: compressed air, vacuum</li> <li>• High resistance to UV radiation</li> <li>• Suitable for use with energy chains</li> </ul>	<ul style="list-style-type: none"> <li>• Highly flexible single-sheath plastic tubing</li> <li>• Flame retardant to UL 94 V0 ... V2</li> <li>• For use in the immediate vicinity of welding applications</li> <li>• Polyurethane</li> <li>• Operating medium: compressed air, vacuum</li> <li>• High resistance to microbes and hydrolysis</li> <li>• Suitable for use with water as an operating medium</li> </ul>
<b>online:</b> →	<a href="#">pun</a>	<a href="#">pun-h</a>	<a href="#">pun-cm</a>	<a href="#">pun-v0</a>




### Standard O.D. tubing

Type	 Plastic tubing PEN	 Plastic tubing PAN	 Plastic tubing PAN-MF	 Plastic tubing PAN-R
O.D.	4 ... 16 mm	4 ... 16 mm	4 ... 16 mm	4 ... 16 mm
I.D.	2.7 ... 10.8 mm	2.9 ... 12 mm	2.5 ... 12 mm	2.5 ... 10 mm
Temperature-dependent operating pressure	-0.95 ... +10 bar	-0.95 ... +19 bar	-0.95 ... +31 bar	-0.95 ... +35 bar
Ambient temperature	-30 ... +60 °C	-30 ... +80 °C	-60 ... +100 °C	-30 ... +80 °C
Description	<ul style="list-style-type: none"> <li>• Polyethylene</li> <li>• RoHS compliant</li> <li>• Operating medium: compressed air, vacuum</li> <li>• Good resistance to chemicals and very good hydrolysis resistance</li> <li>• Resistant to most cleaning agents and lubricants</li> <li>• Suitable for use with water as an operating medium</li> </ul>	<ul style="list-style-type: none"> <li>• High thermal and mechanical load capacities</li> <li>• High resistance to microbes</li> <li>• Polyamide</li> <li>• Operating medium: compressed air, vacuum</li> </ul>	<ul style="list-style-type: none"> <li>• High thermal and mechanical load capacities</li> <li>• Meets the requirements according to DIN 73378 "Polyamide tubing for use in motor vehicles"</li> <li>• Operating media compressed air, mineral oil</li> </ul>	<ul style="list-style-type: none"> <li>• For applications with a high pressure range</li> <li>• High resistance to microbes</li> <li>• Polyamide</li> <li>• Operating medium: compressed air, vacuum</li> </ul>
online: →	<a href="#">pen</a>	<a href="#">pan</a>	<a href="#">pan-mf</a>	<a href="#">pan-r</a>




### Standard O.D. tubing

Type	 Plastic tubing PAN-V0	 Plastic tubing PLN	 Plastic tubing PFAN
O.D.	6 ... 14 mm	4 ... 16 mm	4 ... 12 mm
I.D.		2.9 ... 12 mm	2.9 ... 8.4 mm
Temperature-dependent operating pressure	-0.95 ... +12 bar	-0.95 ... +14 bar	-0.95 ... +16 bar
Ambient temperature	-30 ... +90 °C	-30 ... +80 °C	-20 ... +150 °C
Description	<ul style="list-style-type: none"> <li>• Double-sheath tubing</li> <li>• PVC, polyamide</li> <li>• Flame retardant according to UL 94 V0</li> <li>• Operating medium: compressed air, vacuum, water, mineral oil</li> <li>• High resistance to microbes, UV radiation</li> <li>• Suitable for use with energy chains</li> <li>• Suitable for use with water as an operating medium</li> </ul>	<ul style="list-style-type: none"> <li>• High resistance to chemicals, microbes, hydrolysis</li> <li>• Approved for use with food</li> <li>• Resistant to most cleaning agents and lubricants</li> <li>• Operating medium: compressed air, vacuum, water</li> <li>• Polyethylene</li> <li>• RoHS compliant</li> <li>• Suitable for use with water as an operating medium</li> </ul>	<ul style="list-style-type: none"> <li>• Pneumatic tubing with resistance to high temperatures and chemicals</li> <li>• Approved for use with food</li> <li>• High resistance to chemicals, microbes, UV radiation, hydrolysis, stress cracks</li> <li>• Perfluoroalkoxy alkane</li> <li>• RoHS compliant</li> <li>• Operating medium: compressed air, vacuum</li> <li>• Suitable for use with water as an operating medium</li> </ul>
online: →	<a href="#">pan-v0</a>	<a href="#">pln</a>	<a href="#">pfan</a>





## Standard I.D. tubing

Type	 Plastic tubing PU	 Plastic tubing PCN	 Rubber hose P
O.D.	11.6 ... 17.6 mm	6.5mm	13 ... 31 mm
I.D.	9 ... 13 mm	4mm	6 ... 19 mm
Temperature-dependent operating pressure	-0.95 ... +10 bar	-0.5 ... +0.25 bar	-0.95 ... +16 bar
Ambient temperature	-35 ... +60 °C	-10 ... +60 °C	-20 ... +80 °C
Description	<ul style="list-style-type: none"> <li>Highly flexible plastic tubing</li> <li>High resistance to abrasion and kinks</li> <li>Polyurethane with reinforcing fabric</li> <li>Operating medium: compressed air, vacuum</li> </ul>	<ul style="list-style-type: none"> <li>For use with condensate drains on D series service units</li> <li>PVC with reinforcing fabric</li> <li>Operating medium: compressed air, water</li> </ul>	<ul style="list-style-type: none"> <li>P-6 and P-9: nitrile rubber</li> <li>P-13 and P-19: ethylene propylene rubber, styrene butadiene rubber</li> <li>With textile reinforcement for female hose connector N</li> <li>Operating medium: compressed air, vacuum, water</li> </ul>
online: →	<a href="#">pu</a>	<a href="#">pcn</a>	<a href="#">p</a>





## Spiral tubing

Type	 Spiral plastic tubing, DUO spiral plastic tubing PUN-S, PUN-S-DUO	 Spiral plastic tubing PUN-SG	 Spiral plastic tubing PPS
O.D.	4 ... 12 mm	9.5 ... 11.7 mm	6.3 ... 7.8 mm
I.D.	2.6 ... 8 mm	6.4 ... 7.9 mm	4.7 ... 6.2 mm
Working length	0.5 ... 6 m	2.4 ... 6 m	7.5 ... 15 m
Temperature-dependent operating pressure	-0.95 ... +10 bar	-0.95 ... +15 bar	-0.95 ... +21.2 bar
Ambient temperature	-35 ... +60 °C	-40 ... +60 °C	-30 ... +80 °C
Description	<ul style="list-style-type: none"> <li>Highly flexible plastic tubing</li> <li>Suitable for use with energy chains</li> <li>Polyurethane</li> <li>High resistance to UV radiation, stress cracks</li> <li>Operating medium: compressed air, vacuum</li> <li>Also in the form of DUO plastic tubing</li> </ul>	<ul style="list-style-type: none"> <li>Pre-assembled with captive rotatable fittings</li> <li>Polyurethane, nickel-plated brass, poly-acetal</li> <li>High resistance to microbes, hydrolysis</li> <li>Operating medium: compressed air, vacuum</li> </ul>	<ul style="list-style-type: none"> <li>Pre-assembled with 2 rotatable connectors and captive sealing rings OL</li> <li>Polyamide, brass, galvanised steel</li> <li>Operating medium: compressed air, vacuum, water</li> <li>Suitable for use with energy chains</li> <li>High resistance to microbes</li> <li>RoHS compliant</li> </ul>
online: →	<a href="#">spiral</a>	<a href="#">spiral</a>	<a href="#">pps</a>

## Push-in fittings




Type	 Push-in fitting NPQH	 Push-in fitting NPQM	 Push-in fitting NPQP	 Cartridge QSP10, QSPK, QSPKG, QSPLK, QSPLKG, QSPLLK, QSPLKKG
<b>Pneumatic connection</b>	Male thread M5, M7, G1/8, G1/4, G3/8, G1/2, for tubing O.D. 4 mm, 6 mm, 8 mm, 10 mm, 12 mm, 14 mm, female thread G1/8, G1/4	G1/8, G1/4, G3/8, G1/2, M5, M7, push-in sleeve QS-4, QS-6, QS-8, QS-10, QS-12, for tubing O.D. 4, 6, 8, 10, 12 mm	male thread R1/8, R1/4, R3/8, R1/2, push-in sleeve QS-4, QS-6, QS-8, QS-10, QS-12, for tubing O.D. 4, 6, 8, 10, 12 mm	QSP...10, 14, 18, 20, for tubing O.D. 3 mm, 4 mm, 6 mm, 8 mm, 10 mm, 12 mm
<b>Pneumatic connection, outlet</b>	for tubing O.D. 4 mm, 6 mm, 8 mm, 10 mm, 12 mm, 14 mm	for tubing O.D. 3, 4, 6, 8, 10, 12 mm		
<b>Operating pressure for entire temperature range</b>	-0.95 ... +20 bar	-0.95 ... +16 bar		
<b>Temperature-dependent operating pressure</b>			-0.95 ... +10 bar	-0.95 ... +10 bar
<b>Ambient temperature</b>	0 ... 150 °C	-20 ... +70 °C	-20 ... +60 °C	-5 ... +60 °C
<b>Description</b>	<ul style="list-style-type: none"> <li>Resistant to pressure</li> <li>All metal push-in fitting made of chemically nickel-plated brass</li> <li>High corrosion and chemical resistance</li> <li>Suitable for use with water as an operating medium</li> </ul>	<ul style="list-style-type: none"> <li>Standard series</li> <li>Attractively priced metal push-in fitting</li> <li>Male or female thread with external or internal hex</li> <li>Suitable for use with water as an operating medium</li> </ul>	<ul style="list-style-type: none"> <li>Low-cost alternative to stainless steel: resistant to most cleaning agents in combination with tubing PLN</li> <li>Polypropylene fitting for use in applications with extreme influence of media</li> <li>Suitable for use with food</li> </ul>	<ul style="list-style-type: none"> <li>Plug-in cartridges</li> <li>Straight or angled design</li> <li>Suitable for vacuum</li> <li>Operating medium: compressed air to ISO 8573-1:2010 [7:-:-]</li> </ul>
<b>online:</b> →	<a href="#">npqh</a>	<a href="#">npqm</a>	<a href="#">npqp</a>	<a href="#">qsp</a>

## Push-in fittings





Type	 Push-in fitting QSM, QSMC, QSMF, QSMY, QSMS, QSML, QSMLL, QSMLV, QSMLLV, QSMT, QSMTL, QSMX,QSMY	 Push-in fitting QSM-B, QSML-B, QSMT-B	 Push-in fitting QS, QSF, QSS, QSSF, QSC, QSH, QSL, QSLL, QSLF, QSLV, QST, QSTF, QSTL, QSW, QSX, QSY, QSYL, QSYLV, QSYTF	 Push-in fitting QS-B, QSL-B, QSLL-B, QST-B, QSTL-B, QSY-B
<b>Pneumatic connection</b>	Male thread G1/8, M3, M5, M6, M6x0.75, M7, M8x0.75, R1/8, female thread M3, M5, push-in sleeve QS-3, QS-4, QS-6,, for tubing O.D. 3, 4, 6 mm	Male thread M3, M5, M7, R1/8, for tubing O.D. 3, 4, 6 mm	Male thread G1/8, G1/4, G3/8, G1/2, M5, R1/8, R1/4, R1/2, R3/8, female thread G1/8, G1/4, G3/8, G1/2, push-in sleeve QS-4, QS-6, QS-8, QS-10, QS-12, QS-16,, for tubing O.D. 4, 6, 8, 10, 12, 16 mm	male thread R1/8, R1/4, R3/8, R1/2, for tubing O.D. 4, 6, 8, 10, 12, 16 mm
<b>Pneumatic connection, outlet</b>	for tubing O.D. 2, 3, 4, 6 mm	for tubing O.D. 3, 4, 6 mm	female thread G1/8, G1/4, G3/8, G1/2, for tubing O.D. 4, 6, 8, 10, 12, 16 mm	for tubing O.D. 4, 6, 8, 10, 12, 16 mm
<b>Operating pressure for entire temperature range</b>				
<b>Temperature-dependent operating pressure</b>	-0.95 ... +14 bar	-0.95 ... +10 bar	-0.95 ... +14 bar	-0.95 ... +10 bar
<b>Ambient temperature</b>	-10 ... +80 °C	-10 ... +60 °C	-10 ... +80 °C	-10 ... +60 °C
<b>Description</b>	<ul style="list-style-type: none"> <li>• Mini series</li> <li>• Compact for maximum component density in confined spaces</li> <li>• Male or female thread with external or internal hex</li> </ul>	<ul style="list-style-type: none"> <li>• Mini series, core functions</li> <li>• Compact for maximum component density in confined spaces</li> <li>• Male thread with external or internal hex</li> </ul>	<ul style="list-style-type: none"> <li>• Standard series</li> <li>• Male or female thread with external or internal hex</li> <li>• Wide range of variants: wide selection for maximum flexibility in standard applications</li> <li>• Resistant to pressure: economical for pneumatic installations in the high-pressure range</li> <li>• Suitable for use with water as an operating medium</li> </ul>	<ul style="list-style-type: none"> <li>• Standard series, core functions</li> <li>• Male thread with external or internal hex</li> <li>• Economical, universal application and attractively priced</li> <li>• High resistance</li> <li>• Easy to install</li> </ul>
<b>online:</b> →	<a href="#">qsm</a>	<a href="#">qsm-b</a>	<a href="#">qs</a>	<a href="#">qs-b</a>







## Push-in fittings

Type	 Push-in fitting CRQS, CRQSL, CRQSS, CRQST, CRQSY	 Push-in fitting QS-V0, QSL-V0, QST-V0	 Self-sealing/rotary push-in fitting QSK, QSSK, QSKL, QSR, QSRL
<b>Pneumatic connection</b>	Male thread M5, R1/8, R1/4, R3/8, R1/2, for tubing O.D. 4, 6, 8, 10, 12, 16 mm	G1/8, G1/4, G3/8, G1/2, R1/8, R1/4, R3/8, R1/2, for tubing O.D. 4, 6, 8, 10, 12 mm	Male thread G1/8, G1/4, G3/8, G1/2, M5, R1/8, R1/4, R3/8, R1/2, for tubing O.D. 4, 6, 8, 10, 12 mm
<b>Pneumatic connection, outlet</b>	for tubing O.D. 4, 6, 8, 10, 12, 16 mm	for tubing O.D. 4, 6, 8, 10, 12 mm	for tubing O.D. 4, 6, 8, 10, 12 mm
<b>Operating pressure for entire temperature range</b>	-0.95 ... +10 bar	-0.95 ... +10 bar	
<b>Temperature-dependent operating pressure</b>			-0.95 ... +14 bar
<b>Ambient temperature</b>	-15 ... +120 °C	0 ... 60 °C	-10 ... +80 °C
<b>Description</b>	<ul style="list-style-type: none"> <li>Stainless steel</li> <li>Maximum corrosion resistance (corrosion resistance class 4 to Festo standard 940 070) and chemical resistance</li> <li>Approval for use in the food and beverage industry</li> <li>Male thread with internal and external hex</li> <li>Suitable for use with water as an operating medium</li> </ul>	<ul style="list-style-type: none"> <li>Resistant to welding spatter</li> <li>For use in all areas where there is a risk of fire</li> <li>Reliable even for applications in close proximity to welding spatter</li> <li>Male thread with external hex</li> <li>Suitable for use with water as an operating medium</li> </ul>	<ul style="list-style-type: none"> <li>Standard series</li> <li>Male thread with external hex</li> <li>Push-in fitting that blocks the air flow after the tubing is disconnected</li> <li>Push-in fitting with swivel connection, rotatable by 360° with max. of 500 rpm</li> </ul>
<b>online: →</b>	<a href="#">crqs</a>	<a href="#">qs-v0</a>	<a href="#">qsk</a>


## Barbed fittings

Type	 Fitting NPCK	 Barbed fitting CN, CRCN, FCN, L-PK, LCN, N, RTU, SCN, LCNH, T-PK, TCN, V-PK, Y-PK	 Female hose connector C-P, N-P, N-MS, SK	 Quick connector ACK, CK, QCK, SCK, CV-PK, GCK-KU, LCK, LCKN, TCK, KCK-KU, FCK-KU, MCK, LK, TK, VT
<b>Nominal width</b>	2 ... 6.2 mm	1.3 ... 16.5 mm	2.5 ... 16.5 mm	1.7 ... 12 mm
<b>Pneumatic connection</b>	G1/8, G1/4, G3/8, M5	G1/8, G1/4, G3/8, M3, M5, PK-2, PK-3, PK-4, PK-6	G1/8, G1/4, G3/8, G1/2, G3/4, M5, PK-3, PK-4, PK-6, PK-9, PK-13, PK-19, R1	G1/8, G1/4, G3/8, G1/2, M5, M6x0.75, M10x1, M12x1, M16x1, with union nut: PK-3, PK-4, PK-6, PK-9, PK-13, R1/8, R1/4, R3/8
<b>Operating pressure</b>	-0.95 ... +12 bar			-0.9 ... +16 bar
<b>Ambient temperature</b>	-20 ... +120 °C	0 ... 60 °C		-20 ... +80 °C
<b>Description</b>	<ul style="list-style-type: none"> <li>Suitable for the food industry, satisfies all Clean Design requirements</li> <li>Stainless steel design</li> <li>External thread</li> <li>Straight design</li> <li>Suitable for use with water as an operating medium</li> </ul>	<ul style="list-style-type: none"> <li>With male thread or with male thread and external hex</li> <li>Stainless steel design</li> <li>Straight design, T-shape, L-shape, V-shape, Y-shape</li> </ul>	<ul style="list-style-type: none"> <li>For hose clip</li> <li>Female hose connector with or without sealing ring</li> <li>Hose clip to DIN 3017</li> <li>Brass, aluminium design</li> </ul>	<ul style="list-style-type: none"> <li>Quick connector</li> <li>Bulkhead quick connector</li> <li>Sealing cap for plastic tube fittings and barbed connectors</li> <li>T-distributor</li> <li>Union nut for CK tube fitting</li> <li>Multiple distributor</li> <li>Female or male thread with sealing ring</li> <li>Aluminium or polymer design</li> </ul>
<b>online: →</b>	<a href="#">npck</a>	<a href="#">cn</a>	<a href="#">c-p</a>	<a href="#">ck</a>


## Threaded fittings

				
Type	<b>Threaded fitting NPFC</b>	<b>Adapter NPFV</b>	<b>Reducer, sleeve, double nipple D, E, ESK, FR, G, LJK, NPFA, QM, QMR, QSP10, SCM, TJK</b>	<b>Ring piece, hollow bolt LK, TK, VT</b>
Pneumatic connection 1	G1/8, G1/4, G3/8, G1/2, G3/4, G1, M5, M7, R1/8, R1/4, R3/8, R1/2, R3/4, R1	G1/4	G1/8, G1/4, G3/8, G1/2, G3/4, G1, M3, M5, M7, R1/8, R1/4, R3/8, R1/2	M5, G1/8, G1/4, G3/8, PK-3, PK-4, PK-6 with union nut
Pneumatic connection 2	G1/8, G1/4, G3/8, G1/2, G3/4, G1, M5, R1/8, R1/4, R3/8, R1/2, R3/4, R1	G1/4, NPT1/4-18	G1/8, G1/4, G3/8, G1/2, G3/4, G1, M3, M5, M7, R1/8, R1/4, R3/8, R1/2	
Operating pressure	-0.95 ... +50 bar	≤ 8 bar	-0.95 ... +16 bar	0 ... 10 bar
Nominal width		6mm	2.5 ... 18.6 mm	
Ambient temperature	-20 ... +150 °C		-10 ... +60 °C	
Description	<ul style="list-style-type: none"> <li>• Sleeve</li> <li>• Reducing sleeve</li> <li>• Extension</li> <li>• Double nipple</li> <li>• Reducing nipple</li> <li>• L, T, Y or X-fitting</li> <li>• With female and male thread</li> </ul>	<ul style="list-style-type: none"> <li>• Adapter with filter</li> <li>• From G 1/4 to NPT 1/4 or G 1/4</li> </ul>	<ul style="list-style-type: none"> <li>• Reducing nipple</li> <li>• Reducing sleeve</li> <li>• Double nipple</li> <li>• Distributor block</li> <li>• Female bulkhead fitting</li> <li>• Sleeve</li> </ul>	<ul style="list-style-type: none"> <li>• Multiple distributor consisting of hollow bolt VT and ring piece LK or TK</li> <li>• With two to six outlets and one common air feed</li> </ul>
online: →	<a href="#">npfc</a>	<a href="#">npfv</a>	<a href="#">esk</a>	<a href="#">lk</a>




## Threaded fittings

	
Type	<b>Blanking plug B</b>
Pneumatic connection 1	M3, M5, M7, G1/8, G1/4, G3/8, G1/2, G3/4, G1
Pneumatic connection 2	
Operating pressure	
Nominal width	
Ambient temperature	
Description	<ul style="list-style-type: none"> <li>• With sealing ring</li> </ul>
online: →	<a href="#">b-1</a>


## Click fitting

Type	 <b>Click fittings</b> <b>NPKA</b>
Pneumatic connection 1	G1/8
Pneumatic connection 2	for tubing O.D. 6 mm
Operating pressure	-0.95 ... +10 bar
Nominal width	4 mm
Ambient temperature	-10 ... +60 °C
Description	<ul style="list-style-type: none"> <li>• Suitable for the food industry</li> <li>• Completely from plastic</li> <li>• Suitable for use in cleaning-intensive areas</li> <li>• Quick and simple tube installation using one hand</li> <li>• Straight design, L-shaped, T-shaped</li> <li>• Male thread with internal/external hex</li> <li>• Suitable for use with water as an operating medium</li> </ul>
online: →	<a href="#">npka</a>





## Pipes

Type	 <b>Plastic pipe</b> <b>PQ-PA</b>	 <b>Pipe</b> <b>PQ-AL</b>	 <b>Plastic-coated metal tube</b> <b>PM</b>
O.D.	12 ... 28 mm	12 ... 28 mm	6 ... 8 mm
Information on tubing materials	PA	Wrought aluminium alloy	Wrought aluminium alloy, PE
Operating pressure	-0.95 ... +7 bar	-0.95 ... +7 bar	
Temperature-dependent operating pressure			-0.95 ... +30 bar
Ambient temperature	-25 ... +75 °C	-30 ... +75 °C	-29 ... +65 °C
Description	<ul style="list-style-type: none"> <li>• Rigid pipe made from high-quality polyamide</li> <li>• Operating medium: compressed air, vacuum, liquids</li> <li>• Flexible, maintenance-free</li> <li>• Smooth inside wall ensures optimum flow conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Rigid aluminium pipe</li> <li>• Operating medium: compressed air, vacuum, liquids</li> <li>• Corrosion resistant</li> <li>• Smooth inside wall ensures optimum flow conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Operating medium: compressed air, vacuum</li> <li>• Resistant to deformation</li> <li>• Can be bent straight and reshaped several times without a pipe-bending device and without being damaged</li> <li>• Polyethylene, wrought aluminium alloy</li> <li>• RoHS compliant</li> </ul>
online: →	<a href="#">pq</a>	<a href="#">pq-al</a>	<a href="#">pm</a>





## Push-in fittings for piping PQ

	
<b>Type</b>	<b>Push-in fitting</b> CQ, CQA, CQC, CQD, CQH, CQL, CQO, CQSR, CQT
<b>Pneumatic connection</b>	Male thread G3/8, G1/2, G3/4, G1, Push-in sleeve CQ-12, CQ-15, CQ-18, CQ-22, CQ-28, push-in sleeve QS-12, QS-16, for pipe/tubing O.D. 12, 15, 18, 22, 28 mm
<b>Nominal width</b>	8 ... 24.9 mm
<b>Temperature-dependent operating pressure</b>	-0.95 ... +15 bar
<b>Ambient temperature</b>	-25 ... +75 °C
<b>Description</b>	<ul style="list-style-type: none"> <li>• For pipes PQ-PA, PQ-AL and tubing PAN and PUN</li> <li>• Operating medium: compressed air, vacuum, liquids</li> <li>• Push-in fitting</li> <li>• Push-in connector</li> <li>• Push-in connector with push-in sleeve</li> <li>• Push-in sleeve</li> <li>• Blanking plug</li> <li>• Distributors</li> <li>• Fluid separator</li> <li>• Retaining ring</li> <li>• Releasing tool</li> <li>• External thread</li> </ul>
<b>online:</b> →	<a href="#">cq</a>



## Couplings

				
<b>Type</b>	<b>Quick coupling socket, quick coupling plug</b> KDMS6, KDS6, KSS6	<b>Quick coupling socket, quick coupling plug</b> KD1, KD2, KD3, KD4, KD5, KS1, KS2, KS3, KS4, KS5	<b>Multiple connector</b> KSV, KDV, KDV	<b>Multi-tube connector</b> KM
<b>Pneumatic connection</b>	Male thread G1/4, G3/8, G1/2,, G1/8, G1/4, G3/8, G1/2, female thread G1/4, G3/8, G1/2, with union nut: PK-9, PK-13,, barbed fitting PK-9	Male thread G1/8, G1/4, G1/2, M5, G1/8, G1/4, G3/8, G1/2, female thread G1/8, G1/4, G3/8, G1/2, M5, M3, M5, PK-2, P-13, with union nut: PK-3, PK-4, PK-6, PK-9, PK-13, Barbed connector PK-4, PK-6, PK-9	PK-2, PK-3, PK-4, PK-6, for tubing O.D. 3 mm, 4 mm, 6 mm	PK-2, PK-3, PK-4
<b>Nominal flow rate</b>	936 ... 1935 l/min	44 ... 2043 l/min		
<b>Operating pressure</b>	-0.95 ... +12 bar	-0.95 ... +15 bar	-0.95 ... +16 bar	-0.95 ... +8 bar
<b>Ambient temperature</b>	-10 ... +60 °C	-10 ... +80 °C	-10 ... +60 °C	-10 ... +60 °C
<b>Description</b>	<ul style="list-style-type: none"> <li>• Safety coupling</li> <li>• Shut-off at one end</li> <li>• With male or female thread</li> <li>• Coupling variants: plastic and metal</li> </ul>	<ul style="list-style-type: none"> <li>• Quick connection coupling for standard applications without safety function</li> <li>• With male or female thread or with barbed fitting or quick connector</li> <li>• Shut-off at one or both ends</li> </ul>	<ul style="list-style-type: none"> <li>• Multi-plug, multi-socket</li> <li>• Terminal plug and terminal socket</li> </ul>	<ul style="list-style-type: none"> <li>• For max. 22 lines</li> <li>• Used as control cabinet outlet</li> </ul>
<b>online:</b> →	<a href="#">kdms</a>	<a href="#">kd1</a>	<a href="#">ksv</a>	<a href="#">km</a>


## Distributor

				
Type	<b>Multiple distributor</b> QSLV, QSQ, QST3	<b>Multiple distributor</b> QSYTF	<b>Distributor block</b> FR	<b>Rotary distributor</b> GF
Pneumatic connection, supply line	Male thread G1/8, G1/4, G3/8, G1/2, male thread R1/8, R1/4, R3/8, R1/2, for tubing O.D. 6, 8, 10 mm	Male thread G1/8, G1/4, G3/8, G1/2, male thread R1/8, R1/4, R3/8, R1/2	G1/8, G3/8, G1/2, G3/4, R1/8, R1/4, R3/8, R1/2	
Pneumatic connection				Male thread G1/4, G3/8, G1/8, G1/4, G1/2, female thread G1/4, G3/8, female thread
Pneumatic connection, outlet	for tubing O.D. 4, 6, 8, 10, 12 mm	female thread G1/8, G1/4, G3/8, G1/2, for tubing O.D. 6 mm, 8 mm, 10 mm, 12 mm	G1/8, G1/4, G1/2, M3, M5, PK-3, PK-4, R1/8, R1/4, R3/8, R1/2	G1/8, G1/4, G1/2, M5
No. of supply lines	1	1	1	
No. of outlets	2 ... 6	3	3 ... 12	
Maximum speed				300 ... 3000 rpm
Description	<ul style="list-style-type: none"> <li>• Standard series</li> <li>• Temperature range up to 80 °C</li> <li>• L-shape, T-shape</li> <li>• Rotatable 360°</li> <li>• Connection via threaded connection or push-in connector</li> <li>• Reducing design</li> <li>• Suitable for use with water as an operating medium</li> </ul>	<ul style="list-style-type: none"> <li>• Standard series</li> <li>• Y-shape</li> <li>• Rotatable 360°</li> <li>• Female and male thread with external hex</li> </ul>	<ul style="list-style-type: none"> <li>• Die-cast aluminium or anodised aluminium</li> <li>• Operating pressure 0 ... 16 bar</li> <li>• 4, 8, 9 or 12 connections</li> </ul>	<ul style="list-style-type: none"> <li>• 4 outlets or 2 axial and radial outlets</li> <li>• Single or multiple rotary distributor</li> <li>• Design with air through-feeds</li> <li>• Operating pressure -0.95 ... +10 bar</li> </ul>
online: →	<a href="#">qslv</a>	<a href="#">qsytf</a>	<a href="#">fr-4</a>	<a href="#">gf</a>





## Protective tubing systems

		
Type	<b>Protective conduit</b> MK, MKG, MKR, MKV	<b>Protective conduit fitting</b> HMZAS, HMZV, MKA, MKGV, MKM, MKRL, MKRS, MKRT, MKRV, MKVM, MKVV, MKY
I.D.	7.5 ... 48 mm	
O.D.	10 ... 52 mm	
Design	Strip-wound metal conduit, Internally and externally corrugated all-plastic conduit, separable	
Ambient temperature	-50 ... +220 °C	-40 ... +200 °C
Description	<ul style="list-style-type: none"> <li>• Metal or plastic design</li> <li>• High alternate bending strength</li> <li>• For protecting pneumatic tubing and electrical cables</li> </ul>	<ul style="list-style-type: none"> <li>• Installation kit</li> <li>• Junction box</li> <li>• Adapter connector</li> <li>• Protective conduit fitting</li> <li>• Lock nut</li> <li>• Protective conduit fitting, straight, L-shape</li> <li>• Protective conduit connector</li> <li>• Y-distributor</li> </ul>
online: →	<a href="#">mkg</a>	<a href="#">mka</a>


## Software tool

<p><b>Configurator</b></p> 	<p>Design a product with numerous features reliably and quickly with the help of the configurator. Select all the required product features step-by-step. The use of logic checks ensures that only correct configurations are available for selection.</p>	<p>The configurator is part of the electronic catalogue and is not available as a separate software program.</p>
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## Universal connecting cables

Type	 Connecting cable <b>NEBU</b>	 Plug socket with cable <b>SIM</b>	 Flat cable <b>KASI</b>	 Connecting cable <b>KEA</b>
<b>Electrical connection</b>	socket: straight, angled, rotatable, plug: straight, angled, M5x0.5, M8x1, M12x1, 7/8", 2-pin, 3-pin, 4-pin, 5-pin and 8-pin, rotatable thread, open end	3-pin, 4-pin, 5-pin and 8-pin, straight socket, M12x1, M8 socket, clip	2-pin, open cable end	25-pin, socket,, Sub-D
<b>Cable length</b>	0.1 ... 30 m	2 ... 10 m	100m	5 ... 10 m
<b>Description</b>	<ul style="list-style-type: none"> <li>• Designs for static, standard, energy chain and robot applications</li> <li>• Design with switching status display</li> <li>• Designs for connecting sensors and actuators</li> </ul>	<ul style="list-style-type: none"> <li>• Pre-assembled, pre-assembled at both ends</li> </ul>	<ul style="list-style-type: none"> <li>• For AS-Interface</li> <li>• 2-wire</li> <li>• Reverse polarity protected</li> <li>• Contact using insulation displacement technology</li> <li>• No need to strip cable and wire insulation</li> <li>• Two different colours: yellow (preferred for the AS-Interface network) and black (for auxiliary power supply)</li> </ul>	<ul style="list-style-type: none"> <li>• For multi-pin plug connection</li> <li>• Type of mounting: 2 screws M3x16</li> <li>• Operating voltage range 250 V AC/DC</li> </ul>
<b>online:</b> →	<a href="#">nebu</a>	<a href="#">sim</a>	<a href="#">kasi</a>	<a href="#">kea</a>





## Universal connecting cables

Type	 Connecting cable <b>KM8, KM12</b>
<b>Electrical connection</b>	3-pin, 4-pin, 8-pin, 4-wire, M8x1, M12x1, plug: straight, socket: straight, angled
<b>Cable length</b>	0.5 ... 5 m
<b>Description</b>	<ul style="list-style-type: none"> <li>• For connecting inputs and outputs or for connecting individual valves or sensors</li> <li>• Pre-assembled at both ends: straight plug with straight or angled socket</li> <li>• Type of mounting: union nut, threaded connector</li> </ul>
<b>online:</b> →	<a href="#">km8</a>





### Connecting cables for control systems

Type	 Connecting cable NEBC	 Cablecable SBOA	 Connecting cable FEC-KBG	 Addressing cable KASI-ADR
<b>Electrical connection</b>	5-pin, 9-pin, 15-pin, 3-wire, socket: straight, plug: straight, angled, open end, Cablecable, M9, M12x1, Sub-D, square design	Straight plug/straight socket/straight socket, angled plug/straight socket	RJ11 plug/Sub-D, socket, 15-pin, RJ12 plug/Sub-D, socket, 15-pin	4-pin/4-pin/2-pin, straight socket/angled plug/straight socket
<b>Cable length</b>	0.3 ... 5 m	2m	1.2 m, 1.8 m	2.5 m
<b>Description</b>	<ul style="list-style-type: none"> <li>For I/O interface</li> <li>For connecting motor controller CMMS-ST to any control system</li> </ul>	<ul style="list-style-type: none"> <li>Used as Ethernet diagnostic cable, for integration in a CPI system, for I/O extension, for compact vision system type SBOC-Q, SBOI-Q</li> </ul>	<ul style="list-style-type: none"> <li>For connecting electrical terminal CPX to operator unit FED</li> </ul>	<ul style="list-style-type: none"> <li>For AS-Interface</li> <li>For any slaves such as individual valve interface, valve terminal with AS-Interface connection</li> <li>Reverse polarity protected</li> </ul>
<b>online:</b> →	<a href="#">nebc</a>	<a href="#">sboa</a>	<a href="#">fec-kbg</a>	<a href="#">kasi-adr</a>


### Connecting cables for control systems

Type	 Control cable KES	 Programming cable KDI	 Programming cable PS1-ZK11	 Connecting cable KV-M12
<b>Electrical connection</b>		4-pin, 5-pin, 9-pin, 25-pin, straight socket, straight plug, M8x1, M12x1, Sub-D		Straight plug/straight socket
<b>Cable length</b>	2.5 ... 10 m	2.5 ... 5 m	1.5 m	1.5 ... 3.5 m
<b>Description</b>	<ul style="list-style-type: none"> <li>For I/O interface for connecting motor controller SFC-DC to any control system</li> <li>For I/O interface for connecting motor controller MTR-DCI to any control system</li> </ul>	<ul style="list-style-type: none"> <li>Pre-assembled at both ends</li> <li>For diagnostic interface</li> <li>For servo motor MTR-DCI</li> </ul>	<ul style="list-style-type: none"> <li>Connecting cable for motor controller CMMS-ST</li> </ul>	<ul style="list-style-type: none"> <li>Plug socket with cable for diagnostic interface (to electrical terminal CPX)</li> <li>Pre-assembled at both ends</li> <li>5-pin/4-wire</li> <li>Round plug</li> <li>Mounting via union nut M12</li> </ul>
<b>online:</b> →	<a href="#">kes</a>	<a href="#">kdi</a>	<a href="#">cmms-st</a>	<a href="#">kv-m12</a>





## Connecting cables for motors

Type	 <b>Encoder cable NEBM</b>	 <b>Motor cable KMTR</b>	 <b>Motor cable KMTRE</b>	 <b>Supply cable KPWR</b>
<b>Electrical connection</b>	Connection technology left: M12, A-coded, M23, M40, Sub-D, ITT M3, connection technology right: M12, open end, M12, A-coded, Sub-D, ITT M3			
<b>Cable length</b>	5 ... 15 m	2.5 ... 10 m	5 ... 10 m	2.5 ... 10 m
<b>Description</b>	<ul style="list-style-type: none"> <li>For servo motor EMMS-AS and stepper motor EMMS-ST</li> <li>Suitable for use with energy chains</li> </ul>	<ul style="list-style-type: none"> <li>For motor controller SFC-DC</li> </ul>	<ul style="list-style-type: none"> <li>Screened cable</li> <li>Can be used at -40 ... +125°C</li> <li>Suitable for use with energy chains</li> <li>Protection to IP67</li> <li>For stepper motors MTRE-ST</li> </ul>	<ul style="list-style-type: none"> <li>For motor unit MTR-DCI</li> <li>For motor controller SFC-DC for connecting load and logic supply</li> </ul>
<b>online:</b> →	<a href="#">nebm</a>	<a href="#">kmtr</a>	<a href="#">kmtre</a>	<a href="#">kpwr</a>

## Connecting cables for positioning

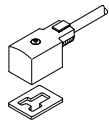
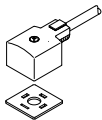

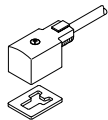
Type	 <b>Connecting cable NEBP</b>
<b>Electrical connection</b>	Plug: screw connector M9x0.5, socket: screw connector M16x0.75
<b>Cable length</b>	2m
<b>Description</b>	<ul style="list-style-type: none"> <li>Connection between linear drive DGPI, DGPI-L or displacement encoder MME and measuring module CPX-CMIX</li> </ul>
<b>online:</b> →	<a href="#">nebp</a>

## Connecting cables for valves





Type	 <b>Connecting cable NEDV</b>	 <b>Plug socket with cable KMYZ-2, KMYZ-3, KMYZ-4, KMYZ-9</b>	 <b>Plug socket with cable KMEB-1, KMEB-2, KMEB-3</b>	 <b>Plug socket with cable KME</b>
<b>Electrical connection</b>	M12, 3-pin, 2x socket: angled, one angled plug, M8, 4-pin	2-pin, 3-pin, 2-wire, socket: angled, plug: straight, angled, Cablecable, square design, M8x1, open end, square design/open end, square design/square design	2-pin, 3-pin, 4-pin, 5-pin, angled socket, type C, to DIN EN 175301-803	3-pin, angled socket, type C, to DIN EN 175301-803
<b>Cable length</b>	0.2 m	0.2 ... 10 m	0.5 ... 10 m	2.5 ... 10 m
<b>Description</b>	<ul style="list-style-type: none"> <li>For VPWP valve</li> <li>Pre-assembled</li> <li>For connection to connecting plate VAPV-S3</li> </ul>	<ul style="list-style-type: none"> <li>For valve with ZB solenoid coil: MZBH, MOZBH</li> <li>For valve with ZC solenoid coil: CPE10-M1BH, CPE14-M1BH, MH2, MH3</li> <li>Mounting via central screw</li> </ul>	<ul style="list-style-type: none"> <li>For valve with EB solenoid coil: CPE18, CPE24, MEBH, MOEBH, JMEBH, JMEBDH, JMN2DH</li> <li>Polyvinyl chloride or polyurethane cable</li> <li>Mounting via central screw</li> </ul>	<ul style="list-style-type: none"> <li>For valve with E solenoid coil: MEH, MOEH, JMEH</li> <li>Mounting via central screw</li> <li>Polyvinyl chloride cable</li> <li>Temperature range -20 ... +80 °C</li> </ul>
<b>online:</b> →	<a href="#">nedv</a>	<a href="#">kmyz-2</a>	<a href="#">kmeb-1</a>	<a href="#">kme</a>




### Connecting cables for valves

				
Type	Plug socket with cable <b>KMF</b>	Plug socket with cable <b>KMC</b>	Plug socket with cable <b>KMH</b>	Plug socket with cable <b>KMV</b>
Electrical connection	socket,	socket,, type A	2-pin, 3-pin, socket,	socket,, type B
Cable length	2.5 ... 10 m	2.5 ... 10 m	0.5 ... 5 m	2.5 ... 10 m
Description	<ul style="list-style-type: none"> <li>For valve with F solenoid coil: MFH, MOFH, JMFH, JMFDH, NVF3, MUFH</li> <li>Mounting via central screw</li> <li>Polyvinyl chloride cable</li> <li>Temperature range -20 ... +80 °C</li> </ul>	<ul style="list-style-type: none"> <li>For valve with D solenoid coil: MDH, MODH, JMDH,</li> <li>For valve with N1 solenoid coil: MN1H, JMN1H, JMN1DH</li> <li>Polyvinyl chloride cable</li> <li>Mounting via central screw</li> <li>Temperature range -20 ... +80 °C</li> </ul>	<ul style="list-style-type: none"> <li>For miniature valve MHA1 and MHP1</li> <li>For fast-switching valve MHA2 and MHP2</li> <li>Mounting via clip</li> <li>Temperature range -40 ... +80 °C</li> <li>Polyvinyl chloride cable</li> </ul>	<ul style="list-style-type: none"> <li>For valve with V solenoid coil</li> <li>Mounting via central screw M3</li> <li>Polyvinyl chloride cable</li> <li>Temperature range -20 ... +80 °C</li> </ul>
online: →	<a href="#">kmf</a>	<a href="#">kmc</a>	<a href="#">kmh</a>	<a href="#">kmv</a>





### Connecting cables for valves

				
Type	Electrical plug-in base <b>MHAP-PI</b>	Plug socket with cable <b>KMPPE</b>	Connecting cable <b>KMPYE-AIF, KMPYE-5, KMPYE-...</b>	Connecting cable <b>MHJ9-KMH</b>
Electrical connection	2-pin, 3-pin, socket,	8-pin, angled, socket, M16		2-pin/2-pin/4-wire, straight socket/straight socket/cable
Cable length	0.5 ... 1 m	2.5 m, 5 m	0.3 ... 5 m	0.5 ... 2.5 m
Description	<ul style="list-style-type: none"> <li>Plug base with cable for connecting individual valve</li> <li>Pre-assembled</li> <li>2-pin or 3-pin plug socket</li> <li>Mounting via clip</li> </ul>	<ul style="list-style-type: none"> <li>For proportional pressure regulators MPPE and MPPES</li> <li>Temperature range -30 ... +80 °C</li> <li>Mounting with union nut M16x0.75</li> <li>Polyvinyl chloride cable</li> </ul>	<ul style="list-style-type: none"> <li>Plug socket with cable, screened, for proportional directional control valves MPYE with 5 m cable</li> </ul>	<ul style="list-style-type: none"> <li>For valves MHJ9</li> <li>With plug sockets KMH</li> <li>With control electronics for two valves</li> </ul>
online: →	<a href="#">mhap</a>	<a href="#">kmppe</a>	<a href="#">kmpye</a>	<a href="#">mhj9-kmh</a>


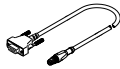


### Connecting cables for valves

	
Type	Connecting cable <b>NEBV-H1, NEBV-M8</b>
Electrical connection	2-pin, 3-pin, 4-pin, socket: straight, angled, plug: straight, Cablecable, M8x1, square design
Cable length	0.5 ... 10 m
Description	<ul style="list-style-type: none"> <li>Connecting cable for valves with ZC solenoid coils (CPE10, CPE14), for valves VUVG</li> <li>Pre-assembled</li> </ul>
online: →	<a href="#">nebv</a>


## Connecting cables for valve terminals

				
Type	Connecting cable NEBV-S1	Connecting cable KMP3, KMP4, KMP6	Connecting cable KRP	Connecting cable KVI
Electrical connection	10-pin, 15-pin, 25-pin, 26-pin, 37-pin, 44-pin, socket: straight, angled	15-pin, 25-pin, 26-pin, 9-pin, socket, Sub-D	2-pin, angled socket	Straight plug/straight socket, angled plug/angled socket, 5-pin round plug
Cable length	2.5 m, 5 m, 10 m	2.5 ... 10 m	2.5 ... 5 m	0.25 ... 8 m
Description	<ul style="list-style-type: none"> <li>Connecting cable for multi-pin plug connection</li> <li>Pre-assembled</li> </ul>	<ul style="list-style-type: none"> <li>Plug socket with cable for multi-pin plug connection</li> <li>Pre-assembled</li> <li>Mounting via union nut, with 2 screws</li> </ul>	<ul style="list-style-type: none"> <li>Plug socket with cable for connecting relay plates (valve terminal CPV10 and CPV14)</li> <li>Pre-assembled</li> <li>Mounting via self-tapping central screw</li> </ul>	<ul style="list-style-type: none"> <li>For fieldbus connection (CP bus valve terminal CPV and installation system CPI)</li> <li>Pre-assembled at both ends</li> <li>Suitable for use with energy chains</li> </ul>
online: →	<a href="#">nebv-s1</a>	<a href="#">kmp</a>	<a href="#">krp</a>	<a href="#">kvi</a>




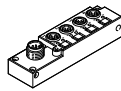
## Connecting cables for valve terminals

				
Type	Connecting cable KVIA	Fieldbus adapter FBA-CO, FBA-PB	T-adapter FB-TA	Connecting cable VMPA-KMS1, VMPA-KMS2, VMPAL-KM, VMPAL-KMSK
Electrical connection	straight plug, straight socket, angled socket	9-pin/5-pin, Sub-D/M12x1	5-pin, M12x1/M8x1, Plug/socket	25-pin, 44-pin, socket Sub-D
Cable length	5 ... 10 m		1.4 m	2.5 ... 10 m
Description	<ul style="list-style-type: none"> <li>For inputs/outputs (analogue connections)</li> <li>Pre-assembled at both ends</li> <li>4-pin/5-pin round plug</li> <li>Suitable for use with energy chains</li> </ul>	<ul style="list-style-type: none"> <li>9-pin Sub-D plug to 5-pin round plug/M12 socket</li> </ul>	<ul style="list-style-type: none"> <li>For fieldbus connection (for valve terminal CPV and CP installation system)</li> <li>Branch line for connecting and disconnecting fieldbus components</li> <li>With open cable end or with 5-pin push-in connector</li> </ul>	<ul style="list-style-type: none"> <li>Plug socket with cable for multi-pin connection (to valve terminal MPA)</li> <li>Variant suitable for use with energy chains</li> <li>Cable outlet straight or to side</li> <li>Pre-assembled at one end</li> <li>PVC or polyurethane cable</li> </ul>
online: →	<a href="#">kvia</a>	<a href="#">fba</a>	<a href="#">fb-ta</a>	<a href="#">vmpa-kms</a>




## Connecting cables for sensors

	
Type	Connecting cable NEBS
Electrical connection	Socket, square design L1, 4-pin, Socket, square design L2, 4-pin, Socket, square design L2, 5-pin
Cable length	2.5 ... 5 m
Description	<ul style="list-style-type: none"> <li>For pressure sensor SPAB</li> <li>Protection class IP40</li> </ul>
online: →	<a href="#">nebs</a>





### Universal plug connectors

				
Type	<b>Plug socket with cable</b> NEFU	<b>plug connector</b> NECU, NECU-HX	<b>Push-in T-connector</b> NEDU	<b>Multi-pin plug distributor</b> NEDU
Electrical connection	M12x1 socket, 4-pin, A-coded	3-pin, 4-pin, 5-pin, 8-pin, 9-pin, Sub-D, straight socket, straight plug, spring-loaded terminal, screw terminal, insulation displacement connector, 7/8", AIDA push-pull, M8x1, M12x1, pre-assembled, can be screened, square design	4-pin/3-pin, 4-pin/4-pin, A-coded/A-coded, M12x1/M12x1, M12x1/M8x1, M8x1/M8x1, plugs/sockets	3-pin, 8-pin, M8, M12, Socket, plug
Connection cross section		0.08 ... 2.5 mm <sup>2</sup>		
Degree of protection	IP65, in assembled state	IP40, IP65, IP67, IP68	IP65, IP67	IP68
Description	<ul style="list-style-type: none"> <li>• Cable socket for branching the AS-Interface network at any desired point</li> <li>• Reconnecting AS-Interface flat cable to 5-pin M12 socket</li> <li>• Reverse polarity protected</li> </ul>	<ul style="list-style-type: none"> <li>• Power supply socket for fieldbus connection</li> <li>• Plug and socket for power supply</li> <li>• Can be assembled with any cable lengths</li> <li>• NECU-HX: reconnectable M8 and M12 round plug connectors with Harax® quick connection technology for low-voltage applications</li> </ul>	<ul style="list-style-type: none"> <li>• For fieldbus connection</li> <li>• Branch line for connecting and disconnecting fieldbus components</li> </ul>	<ul style="list-style-type: none"> <li>• Multi-pin plug distributor</li> <li>• Particularly compact</li> </ul>
online: →	<a href="#">nefu</a>	<a href="#">necu</a>	<a href="#">nedu</a>	<a href="#">nedu</a>

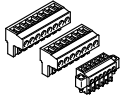
### Universal plug connectors

			
Type	<b>plug connector</b> SEA	<b>Cable distributor</b> ASI-KVT	<b>Plug socket with cable</b> ASI-SD
Electrical connection	3-pin, 4-pin, 5-pin, angled socket, straight plug, screw terminal, insulation displacement connector, solder connection, type A, M8x1, M12x1	2-pin, 4-pin, socket M12, insulation displacement technology	2-pin, 4-pin, 5-pin, straight socket, Straight socket/insulation piercing connector, screw terminal
Connection cross section	0.14 ... 0.75 mm <sup>2</sup>	1.5mm <sup>2</sup>	0.75 ... 1.5 mm <sup>2</sup>
Degree of protection	IP65, IP67	IP65, in assembled state	IP65, IP67
Description	<ul style="list-style-type: none"> <li>• Sensor plug, socket for inputs/outputs</li> <li>• Can be assembled with any cable lengths</li> </ul>	<ul style="list-style-type: none"> <li>• Flat cable distributor for branching or for reconnecting AS-Interface flat cables</li> <li>• Reverse polarity protected</li> </ul>	<ul style="list-style-type: none"> <li>• For AS-Interface</li> <li>• Flat cable socket for connecting AS-Interface stations to the AS-Interface bus system</li> <li>• M12 connection</li> <li>• Reverse polarity protected</li> <li>• Detachable connection</li> </ul>
online: →	<a href="#">sea</a>	<a href="#">asi-kvt</a>	<a href="#">asi-sd</a>





## Plug connectors for control systems

Type	 <b>plug connector NECC</b>	 <b>plug connector PS1-SAC, PS1-ZC</b>	 <b>plug connector FBS-SUB-9-WS</b>	 <b>plug connector FBS-RJ45</b>
<b>Electrical connection</b>	11-pin, 9-pin/9-pin, spring-loaded terminal, plug connector, Sub-D/screw terminal	10-pin/10-pin, 10-pin/30-pin, socket/terminal strip	5-pin, type A, M12x1, straight plug/screw terminal	5-pin, type A, M12x1, straight plug/screw terminal
<b>Connection cross section</b>	0.2 ... 2.5 mm <sup>2</sup>	0.08 ... 0.75 mm <sup>2</sup>	0.75mm <sup>2</sup>	0.75mm <sup>2</sup>
<b>Degree of protection</b>	IP40		IP40, in assembled state, to IEC 60529	IP65, IP67, in assembled state
<b>Description</b>	<ul style="list-style-type: none"> <li>Encoder plug for motor controller CMMS-ST, CMMS-AS</li> <li>Plug for multi-axis controller CMXR for interface housing CAMI-C, 11-pin</li> <li>Plug for multi-axis controllers CMXR and for modular controller CECX for peripheral modules</li> <li>2-pin, 4-pin, 6-pin, 8-pin, 11-pin, 18-pin</li> </ul>	<ul style="list-style-type: none"> <li>For power supply</li> <li>Cable connection using clamping technology</li> <li>Individually or as a set</li> </ul>	<ul style="list-style-type: none"> <li>Plug connector for bus connection CAN Bus and PROFIBUS</li> <li>Cable connection 2x horizontal or 2x vertical</li> <li>Printed circuit terminal block with screw connector</li> </ul>	<ul style="list-style-type: none"> <li>Ethernet plug with 8-pin RJ45 connection</li> <li>High transmission quality</li> <li>Detachable connection</li> </ul>
<b>online:</b> →	<a href="#">necc</a>	<a href="#">ps1</a>	<a href="#">fbs-sub-9-ws</a>	<a href="#">fbs-rj</a>




## Plug connectors for control systems

Type	 <b>Plug assortment NEKM</b>
<b>Electrical connection</b>	2- ... 9-pin, Screw connector
<b>Connection cross section</b>	0.2 ... 2.5 mm <sup>2</sup>
<b>Degree of protection</b>	
<b>Description</b>	<ul style="list-style-type: none"> <li>For motor cable, encoder cable, power supply, reference switch, STO safety function</li> <li>Comprising plug for power supply and plug for motor connection</li> </ul>
<b>online:</b> →	<a href="#">nekm</a>





### Plug connectors for valves

				
Type	<b>Plug socket</b> MSSD	<b>Soldering base</b> PCBC	<b>Multi-pin plug socket</b> NECA	<b>Angled plug socket</b> MPPE-3-B
Electrical connection	3-pin, 4-pin, angled socket, type A, type B, type C, to DIN EN 175301-803, to DIN EN 61984, square design	2-pin, 3-pin	9-pin/9-pin, Sub-D/screw terminal	8-pin, angled socket, solderable
Connection cross section	0.22 ... 1.5 mm <sup>2</sup>		0.34 ... 1 mm <sup>2</sup>	0.75mm <sup>2</sup>
Degree of protection	IP40, IP65, IP67, in assembled state	IP40	IP65	IP67
Description	<ul style="list-style-type: none"> <li>For valves with F, D, N1, V, E, EB, N2, Y, Z, ZB, ZC, MD-2, MH-2 solenoid coils</li> <li>For connecting individual valves</li> <li>Cable connection using clamping screws, insulation displacement technology or push-in connector</li> <li>With or without LED</li> </ul>	<ul style="list-style-type: none"> <li>For mounting miniature valves MHA1 and MHP1 on a PCB with plug connection underneath (-PI)</li> </ul>	<ul style="list-style-type: none"> <li>For soft-start/quick exhaust valves MS6-SV, MS series</li> <li>Electrical connection via 9-pin Sub-D, 9-pin screw terminal</li> </ul>	<ul style="list-style-type: none"> <li>For proportional pressure regulators MPPE and MPPEs</li> <li>Mounting via union nut</li> </ul>
online: →	<a href="#">mssd</a>	<a href="#">pcbc</a>	<a href="#">ms6-sv</a>	<a href="#">mppe-3-b</a>

### Plug connectors for valves

			
Type	<b>Time delay insert</b> MFZ	<b>Illuminating seal</b> MF-LD, MC-LD, MV-LD, ME-LD, MEB-LD	<b>Indicator insert</b> MCL, MCLZ, MFL, MFLZ
Electrical connection	for connector socket or device plug, type F	Type A, B, C, to DIN EN 175301-803, square design, MSC	Plug-in to DIN 43650, Plug-in for F coil
Connection cross section			
Degree of protection	IP64	IP65	IP 64 (without seal: IP40)
Description	<ul style="list-style-type: none"> <li>Electronic timer with adjustable time delay of between 0 and 10 s</li> <li>For mounting between the solenoid coil and connector socket and plug</li> </ul>	<ul style="list-style-type: none"> <li>For mounting between the plug socket and solenoid coil</li> <li>The seal is illuminated yellow when the power is switched on</li> <li>For F, D, N1, V, E, EB solenoid coils</li> </ul>	<ul style="list-style-type: none"> <li>For mounting between the solenoid coil and plug connection</li> <li>With yellow LED display</li> <li>Variant with integrated protective circuit</li> </ul>
online: →	<a href="#">mfz</a>	<a href="#">mc-ld</a>	<a href="#">mcl</a>



## Plug connectors for valve terminals

				
Type	Bus connection <b>FBSD-KL</b>	Plug, plug socket <b>FBS, FBSD</b>	Power supply socket <b>NTSD</b>	Bus connection <b>FBA-1, FBA-2</b>
Electrical connection	5-pin/5-pin, Angled socket/screw terminal	4-pin, 5-pin, socket: straight, angled, plug: straight, screw terminal, type A, M12x1	4-pin, 5-pin, socket: straight, angled, plug: straight, screw terminal	9-pin/5-pin, Straight socket/straight plug, Straight socket/plug and socket, Sub-D/-, Sub-D/M12x1
Connection cross section	0.2 ... 2.5 mm <sup>2</sup>	0.75mm <sup>2</sup> , 0.2 ... 2.5 mm <sup>2</sup>	0.75 ... 2.5 mm <sup>2</sup>	
Degree of protection	IP20	IP20, IP67, in assembled state	IP67	IP40, IP65, IP67
Description	<ul style="list-style-type: none"> <li>5-pin angled socket, 5-pin screw terminal</li> </ul>	<ul style="list-style-type: none"> <li>For fieldbus connection</li> <li>Straight and angled design</li> <li>Can be assembled with any cable lengths</li> </ul>	<ul style="list-style-type: none"> <li>Straight and angled design</li> <li>For power supply</li> <li>Can be assembled with any cable lengths</li> </ul>	<ul style="list-style-type: none"> <li>Can be assembled with any cable lengths</li> </ul>
online: →	<a href="#">fbds-kl</a>	<a href="#">fbs</a>	<a href="#">ntsd</a>	<a href="#">fba-1</a>




## Plug connectors for valve terminals

				
Type	plug connector <b>FBS-SUB</b>	Sensor socket <b>SIE-GD, SIE-WD</b>	Cover cap <b>ISK</b>	Plug socket, plug <b>SD-SUB</b>
Electrical connection	Fieldbus plug with 9-pin Sub-D connection	4-pin, straight socket, angled socket, M12x1		25-pin, plug connector, Sub-D
Connection cross section		0.25 ... 0.75 mm <sup>2</sup>		
Degree of protection	IP65, IP67, in assembled state	IP67		IP65
Description	<ul style="list-style-type: none"> <li>Variants for PROFIBUS DP, INTERBUS nodes CPX and CPV, CC-Link CPX and CPV, CPX-FEC</li> <li>Position of DIL switches can be read externally</li> <li>Easy mounting</li> </ul>	<ul style="list-style-type: none"> <li>For customised fabrication of cables</li> <li>Pin adapter for fieldbus connection</li> <li>With screw terminals</li> <li>Straight or angled design</li> </ul>	<ul style="list-style-type: none"> <li>For sealing unused ports/openings</li> <li>Thread M8, M12</li> </ul>	<ul style="list-style-type: none"> <li>Plug socket for multi-pin plug connection</li> <li>Plug for inputs/outputs</li> <li>Can be assembled with any cable lengths</li> </ul>
online: →	<a href="#">fbs-sub</a>	<a href="#">sie-gd</a>	<a href="#">isk</a>	<a href="#">sd-sub</a>


## Plug connectors for sensors

<b>Type</b>	 <b>Angled plug socket</b> <b>PEV-WD</b>	 <b>Angled plug socket</b> <b>SD-4-WD</b>
<b>Electrical connection</b>	4-pin, angled socket	4-pin, plug connector, Sub-D
<b>Connection cross section</b>		
<b>Degree of protection</b>	IP65	IP65
<b>Description</b>	<ul style="list-style-type: none"> <li>• For pressure switch PEV</li> <li>• 15 ... 30, 180 V DC, 230 V AC</li> <li>• Angled design</li> <li>• Available with LED display</li> </ul>	<ul style="list-style-type: none"> <li>• For swivel module DSMI</li> <li>• Angled design</li> </ul>
<b>online:</b> →	<a href="#">pev*wd</a>	<a href="#">sd-4-wd</a>

## Pneumatic and electropneumatic controllers





Type	 <b>Pulse oscillator</b> TAA, TAB	 <b>Memory module</b> SBA-2N	 <b>Pulse oscillator</b> VLG
<b>Pneumatic connection</b>	Barbed connections for plastic tubing NW3	Barbed connections for plastic tubing NW3	G1/8, G1/4
<b>Type of mounting</b>	on mounting frame	on mounting frame	Through-hole in housing
<b>Nominal width</b>	2 mm	3 mm	3.5 mm, 7 mm
<b>Nominal flow rate</b>	60 l/min	70 l/min	120 l/min, 600 l/min
<b>Description</b>	<ul style="list-style-type: none"> <li>• For ensuring the logical program sequence</li> <li>• Poppet valve with integrated AND as well as OR element</li> </ul>	<ul style="list-style-type: none"> <li>• For input logic operations</li> <li>• For simplifying the planning and installation of pneumatic controllers</li> </ul>	<ul style="list-style-type: none"> <li>• For generating infinitely adjustable signals in controllers</li> <li>• For high-speed cylinder movements of diaphragm cylinders, single and double-acting diaphragm cylinders</li> </ul>
<b>online:</b> →	<a href="#">taa</a>	<a href="#">sba</a>	<a href="#">vlg</a>

## Software tool





<b>CODESYS</b>	 <p><b>CODESYS</b> The IEC 61131-3 Programming System provided by Festo</p>	<p>CODESYS for standardised programming of embedded devices to IEC 61131-3. It makes your life easier with simple commissioning, fast programming and parameterisation.</p> <p><b>Advantages</b></p> <ul style="list-style-type: none"> <li>• Hardware-neutral software platform for quick and easy configuration, programming and commissioning of pneumatic and electric automation solutions</li> <li>• Extensive module libraries for single or multi-axis positioning motions</li> </ul>	<ul style="list-style-type: none"> <li>• The IEC 61131-3 standard means that CODESYS is flexible and open for all types of control tasks</li> <li>• Modular: offline and online functions, as well as components for hardware configuration and visualisation</li> <li>• Convenient IEC function block extension</li> <li>• Re-use of existing application parts</li> </ul> <p>The parameterisation software can be found on the website under Support &gt; Support Portal &gt; enter search term.</p>
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## Electronic controllers

				
Type	<b>Controller</b> CECC-D, CEDD-LK, CECC-S	<b>Controller</b> CECX-C1, CECX-M1	<b>Input/output module</b> CECX-D-E8A, CECX-A-4E4A	<b>Input module</b> CECX-D-16E, CECX-A-4E-V, CECX-E-E-T-P
Operating voltage	19.2 ... 30 V DC	19.2 ... 30 V DC	19.2 ... 30 V DC	
CPU data	Processor 400 MHz	64 MB DRAM, 400 MHz processor		
Type of fieldbus interface	CAN Bus	CAN Bus		
Ethernet, connector plug	RJ45	8-pin, socket, RJ45		
Description	<ul style="list-style-type: none"> <li>• Modern, compact and versatile controller</li> <li>• Programming with CODESYS to IEC 61131-3</li> <li>• 12 digital inputs, 8 digital outputs, two high-speed counters up to 250 kHz</li> <li>• Ethernet 10/100 Mbit/s</li> <li>• USB interface for data transfer</li> <li>• CECC-LK with CANopen, I/O link, I-Port and Modbus TCP protocol</li> </ul>	<ul style="list-style-type: none"> <li>• Modular master controller with CODESYS or motion controller with CODESYS and SoftMotion</li> <li>• Programming to standard IEC 61131-3</li> <li>• Three plug-in slots for optional modules</li> <li>• Optional: communication module for PROFIBUS</li> </ul>	<ul style="list-style-type: none"> <li>• Digital module: 6 and 8 digital inputs and 8 digital outputs</li> <li>• Analogue modules for voltage: 4 analogue voltage inputs and 4 analogue voltage outputs</li> <li>• Analogue modules for current: 4 analogue current inputs and 4 analogue current outputs</li> <li>• Address setting functions, short-circuit monitoring function for outputs, debounce function, interrupt function, sensor malfunction detection function</li> </ul>	<ul style="list-style-type: none"> <li>• Digital modules: 16 digital inputs</li> <li>• Analogue modules for voltage: 4 analogue voltage inputs</li> <li>• Temperature input modules: 4 or 6 temperature inputs</li> </ul>
online: →	<a href="#">cecc</a>	<a href="#">cecx</a>	<a href="#">cecx</a>	<a href="#">cecx</a>





## Electronic controllers

				
Type	<b>Output module</b> CECX-D-14A-2, CECX-A-4A-V	<b>Encoder interface</b> CECX-C-2G	<b>Fieldbus interface</b> CECX-F-PB-S-V, CECX-F-PB-V1, CECX-B-CO	<b>Electrical interface</b> CECX-C-2S1
Operating voltage	24 V DC	19.2 ... 30 V DC		
CPU data				
Type of fieldbus interface			CAN Bus, PROFIBUS-Master DP-V1, PROFIBUS-Slave DP-V0, PROFIBUS-Slave DP-V1	
Ethernet, connector plug		9-pin, socket, RJ45	8-pin, socket, 9-pin, plug connector	9-pin, plug connector
Description	<ul style="list-style-type: none"> <li>• Digital modules: 14 digital outputs</li> <li>• Analogue modules: 4 analogue voltage outputs</li> </ul>	<ul style="list-style-type: none"> <li>• Displacement encoder function</li> <li>• Pulse counter</li> <li>• Speed measuring function</li> <li>• Shaft encoder monitoring function</li> <li>• Counter reading latch function</li> <li>• Sensor break monitoring</li> <li>• Status display function</li> </ul>	<ul style="list-style-type: none"> <li>• PROFIBUS-Master DP-V1</li> <li>• Connection via CAN Bus to the modular controller</li> <li>• For connecting decentralised peripheral modules in series</li> </ul>	<ul style="list-style-type: none"> <li>• For extending the controller with two RS232 serial interfaces</li> </ul>
online: →	<a href="#">cecx</a>	<a href="#">cecx</a>	<a href="#">cecx</a>	<a href="#">cecx</a>




## Electronic controllers

Type	 AS-i module CESA
Operating voltage	30 V DC
CPU data	
Type of fieldbus interface	CANopen, PROFIBUS
Ethernet, connector plug	
Description	<ul style="list-style-type: none"> <li>• AS-i master gateway</li> <li>• Double address recognition</li> <li>• Direct operation</li> <li>• Graphic display</li> <li>• Comprehensive diagnostics via LED and display</li> <li>• Specification 3.0</li> </ul>
online: →	<a href="#">cesa</a>



## Electrical peripherals

Type	 Terminal CPX-P	 Input module CTSL	 Fieldbus module CTEU	 CPI installation system CTEC
Max. no. of inputs	digital 512, Analogue 32	16	64	128
Max. no. of outputs	digital 512, Analogue 18		64	128
No. of module positions	Max. 9 electrical		32	Max. 4 installation strings, Max. 4 CP modules per string
Electrical actuation	Fieldbus, integrated controller	I/O link, I-Port	CanOpen, DeviceNet, CC-Link, PROFIBUS, EtherCAT, I-Port	Fieldbus, integrated controller
Description	<ul style="list-style-type: none"> <li>• Use of harmonised remote I/O and valve terminals in a control cabinet</li> <li>• Unique modular structure</li> <li>• Comprehensive integrated diagnostic and service functions</li> <li>• Combination with modules of the electrical terminal CPX, which enables use for hybrid applications</li> <li>• IP20, IP65</li> </ul>	<ul style="list-style-type: none"> <li>• For installation system CTEL</li> <li>• For recording sensor input signals</li> <li>• Display of the input statuses for each input signal via an assigned LED</li> <li>• Diagnostic LED for short circuit/overload in sensor supply</li> </ul>	<ul style="list-style-type: none"> <li>• For valve terminals VTUB-12, VTUB, VTUG, MPA-L, CPV</li> <li>• Versatile thanks to protection class IP65/67</li> <li>• Fieldbus-typical LEDs, interfaces and switching elements available</li> <li>• Isolated power supply for electronics and valves</li> <li>• Optional basic diagnostics: undervoltage, short circuit</li> <li>• Optionally expandable for low-cost, decentralised installation of two additional valve terminals with I-Port</li> </ul>	<ul style="list-style-type: none"> <li>• Complete concept for decentralised machine and system structure</li> <li>• Combination of centralised and decentralised installation possible with terminal CPX</li> <li>• Decentralised pneumatic components and sensors for fast processes</li> <li>• Centralised electric components for fieldbus and common power supply</li> <li>• With valve terminal CPV, MPA, CPV-SC</li> </ul>
online: →	<a href="#">cpx-p</a>	<a href="#">ctsl</a>	<a href="#">cteu</a>	<a href="#">ctec</a>




## Electrical peripherals

Type	 Terminal CPX	 Electrical interface CPX-CTEL	 AS-Interface® components ASI
Max. no. of inputs	digital 512, Analogue 32	256	
Max. no. of outputs	digital 512, Analogue 18	256	
No. of module positions	Max. 9 electric input/output modules	Max. 4 modules with I-Port interface	
Electrical actuation	Fieldbus, integrated controller	I-Port	AS-Interface
Description	<ul style="list-style-type: none"> <li>Centralised, decentralised, hybrid installation system with maximum modularity and flexibility</li> <li>IP65 and IP67</li> <li>Choice of polymer or metal housing with individual linking</li> <li>Open to common fieldbus protocols and Ethernet</li> <li>Integrated diagnostic and service function</li> <li>Operating modes: stand-alone as remote I/O or with valve terminals MPA-S, MPA-L, VTSA/VTSA-F</li> </ul>	<ul style="list-style-type: none"> <li>Cost-effective: fieldbus connection for the price of a multi-pin interface</li> <li>Decentral input modules and valve terminals with short tubing, short cycle times and low energy consumption combined with CPX terminal</li> <li>Standardised M12 connections reduce cost, installation time and logistics complexity</li> </ul>	<ul style="list-style-type: none"> <li>Accessories for AS-Interface installation system</li> <li>Modules for actuating individual valves ASI-EVA</li> <li>Cable distributor ASI-KVT</li> <li>Addressing device ASI-PRG-ADR</li> <li>Compact I/O modules (IP65, IP67)</li> <li>AS-Interface power supply unit SVG</li> </ul>
online: →	<a href="#">cpx</a>	<a href="#">cpx-ctel</a>	<a href="#">as-interface</a>





## Operator units, text-based

Type	 Operator unit FED-50	 Operator unit CPX-MMI
Display	Monochrome LCD, with backlighting	LCD display, with backlighting
Display size	4 x 20 characters	128 x 64 pixel
Recipe memory	16 KB	
Ethernet interface	Optional, 10 MBd	
No. of user LEDs	5	
No. of function keys	4	3
Description	<ul style="list-style-type: none"> <li>Straightforward design of human-machine dialogues</li> <li>Semi-graphical display of process values makes them easier to read</li> <li>4-line text display and operating buttons</li> <li>Serial interface</li> <li>Recipe handling</li> <li>Password protection</li> </ul>	<ul style="list-style-type: none"> <li>Data retrieval from, configuration and diagnostics of CPX terminals</li> <li>3 function keys, 4 arrow keys</li> <li>Connection to the CPX bus nodes or control block via a pre-assembled M12 cable</li> </ul>
online: →	<a href="#">fed</a>	<a href="#">cpx-mmi</a>



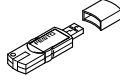
## Operator units, with touchscreen

Type	 Operator unit CDSA	 Operator unit FED-770, FED-3000	 Operator unit CDPX
Display	Colour TFT	Colour TFT	Colour TFT
Display size	6.5"	7", 7.5", 13.3"	4.3", 7", 10.4", 13.3"
Display resolution	VGA, 640 x 480 pixels	WVGA, 800x480 pixels, WXGA, 1280x800 pixels	WQVGA, 480x272 pixels, WVGA, 800x480 pixels, SVGA, 800x600 pixels, WXGA, 1280x800 pixels
Ethernet interface	2nd Ethernet interface optional, 10 MBd, RJ45 10/100 MBd	RJ45 10/100 MBd	RJ45 10/100 MBd
No. of function keys	31		
Description	<ul style="list-style-type: none"> <li>• Interfaces for Ethernet, RS-422-A/RS-232-C, USB host/USB client</li> <li>• Designs with colour touch screen</li> </ul>	<ul style="list-style-type: none"> <li>• Graphics-capable for maximum flexibility when displaying processes and data</li> <li>• No programming effort in the PLC program</li> <li>• Convenient FED Designer WYSIWYG design tool</li> <li>• Shorter project planning thanks to re-usable objects</li> <li>• Trend display</li> <li>• Program sequences display</li> <li>• Can be connected to all FEC® units</li> <li>• Extremely sturdy thanks to metal housing</li> </ul>	<ul style="list-style-type: none"> <li>• Powerful processors combined with wide-screen technology</li> <li>• Remote access, remote control</li> <li>• FTP and HTTP servers</li> <li>• Open for web and multimedia applications</li> </ul>
online: →	<a href="#">cdsa</a>	<a href="#">fed</a>	<a href="#">cdpx</a>


## Software

Type	 Operator package GSIB	 Operator package P.BP	 Software GSPF	 Software and manual P.SW
Description	<ul style="list-style-type: none"> <li>• Information software and documentation for motor controllers CMMD-AS, CMMS-AS, CMMP-AS, CMMS-ST</li> <li>• Operator package contains CD-ROM with user documentation for motor controller and configuration software FCT (Festo Configuration Tool) and a brief description</li> </ul>	<ul style="list-style-type: none"> <li>• Information software and documentation for motor controllers CMMP-AS and SFC-DC, handling module HSP/HSW and motor unit MTC-DCI</li> <li>• Operator package contains CD-ROM with user documentation for motor controller and configuration software FCT (Festo Configuration Tool) and a brief description</li> </ul>	<ul style="list-style-type: none"> <li>• Programming software and documentation for motor controller CMMP-AS with additional functions for cam disc functionality</li> <li>• Software for configuring, programming, commissioning and maintaining for controller CECC</li> <li>• Programming software for creating custom application programs for safety systems CMGA</li> <li>• Operating software for configuring, programming and for AS-Interface diagnostics with serial connecting cable</li> <li>• The software package contains CD-ROM with user documentation for the motor controller</li> </ul>	<ul style="list-style-type: none"> <li>• For configuring the terminal CPX, for parameterising the CPX modules, for programming the controller CPX-FEC</li> <li>• Software for checkbox CHB-C for image evaluation, display, protocol and adaptation of the I/O parameters</li> <li>• Software for Checkbox CHB-C for the complete analysis of recognition processes</li> </ul>
online: →	<a href="#">gsib</a>	<a href="#">software</a>	<a href="#">gspf</a>	<a href="#">software</a>


## Software

			
<b>Type</b>	<b>Software licence</b> GSLO	<b>Software (FluidDraw S5®)</b> GSWF-S5	<b>Software (FluidDraw P5®)</b> GSWF-P5
<b>Description</b>	<ul style="list-style-type: none"> <li>For activating tools on the compact vision system SBOC-Q/SBOI-Q</li> </ul>	<ul style="list-style-type: none"> <li>Quick and easy creation of pneumatic circuit diagrams</li> <li>Extensive library of pneumatic symbols</li> <li>Easy, user-friendly operator guidance</li> <li>Interface to Festo products (catalogue, online shop)</li> </ul>	<ul style="list-style-type: none"> <li>Quick and easy creation of pneumatic circuit diagrams</li> <li>Comprehensive library of pneumatic and electrical symbols</li> <li>User-specific product databases and translation tables</li> <li>Terminal diagrams, cable diagrams, cable lists, parts lists</li> <li>Dimensioning function for producing simple control cabinet and system layouts</li> <li>Consistent equipment identification</li> <li>Multi-level project tree</li> </ul>
<b>online:</b> →	<a href="#">gslo</a>	<a href="#">gswf-s5</a>	<a href="#">gswf-p5</a>


## Documentation

	
<b>Type</b>	<b>Manuals and descriptions</b> GDCW, GDCP, GDCC, GSIB, P.BE, P.BP
<b>Description</b>	<ul style="list-style-type: none"> <li>For software</li> <li>For control blocks</li> <li>For motors and controllers</li> <li>For valve terminals and electrical peripherals</li> <li>For vision systems</li> </ul>
<b>online:</b> →	<a href="#">dokumentationen</a>



## Learning systems

	
<b>Type</b>	<b>EduTrainer®</b> D
<b>Description</b>	<ul style="list-style-type: none"> <li>PLC EduTrainer® support system for use in teaching and training applications</li> <li>Equipped with PLCs from different manufacturers</li> <li>Two series: Universal and Compact</li> <li>Equipped with 19 simulation modules</li> <li>Individually configurable or pre-assembled</li> </ul>
<b>online:</b> →	<a href="#">edutrainner</a>





## Air cushion plates

	
Type	<b>Air cushion plate ATBT</b>
Size	100
Operating pressure	≤2 bar
Pneumatic connection	G1/4
Bearing length	100 ... 1500 mm
Max. surface load during operation	400kg/m <sup>2</sup>
Repetition accuracy of the gliding height	±10 µm
Description	<ul style="list-style-type: none"> <li>• It works without contact by means of an air cushion, with minimal consumption of compressed air</li> <li>• Uniform air flow ensures maximum precision and allows for short cycle times</li> <li>• For transporting and conveying flat products</li> <li>• Suitable for vacuum, can be used as a flat suction cup</li> </ul>
online: →	<a href="#">atbt</a>




## Air reservoirs

		
Type	<b>Air reservoir VZS</b>	<b>Air reservoir CRVZS</b>
Volume	20 l	0.1 l, 0.4 l, 0.75 l, 2 l, 5 litres, 10 litres, 20 l
Information on air reservoir materials	Steel, Painted	High-alloy stainless steel
Conforms to standard	EN 286-1	AD 2000
Condensate drain connection	G3/8	G3/8
Description	<ul style="list-style-type: none"> <li>• Compensation of pressure fluctuations</li> <li>• Provision of large quantities of compressed air for supplying fast pulsing drives</li> <li>• With condensate drain</li> </ul>	<ul style="list-style-type: none"> <li>• Corrosion resistant</li> <li>• Available with condensate drain</li> <li>• Can be used to compensate pressure fluctuations, and act as accumulators in the event of sudden air consumption</li> <li>• Provision of large quantities of compressed air for supplying fast pulsing drives</li> <li>• Designs in accordance with EU Pressure Equipment Directive</li> </ul>
online: →	<a href="#">vzs</a>	<a href="#">crvzs</a>



### Pneumatic silencer

				
Type	<b>Pneumatic silencers AMTE</b>	<b>Pneumatic silencers U</b>	<b>Pneumatic silencers UC</b>	<b>Pneumatic silencers AMTC</b>
Information on silencer insert materials	Bronze	Bronze, PE	PE	PE
Pneumatic connection	G1/8, G1/4, G3/8, G1/2, G3/4, G1, M3, M5, NPT1/8, NPT1/4, NPT3/8, NPT1/2, UNF10-32	G1/8, G1/4, G3/8, G1/2, G3/4, G1, NPT3/4-14, PK-3, PK-4, NPT1-11	G1/8, G1/4, M5, M7, QS-3, QS-4, QS-6, QS-8, QS-10	Cartridge 10 mm
Noise level	55 ... 95 dB(A)	65 ... 84 dB(A)	58 ... 68 dB(A)	58dB(A)
Description	<ul style="list-style-type: none"> <li>• Metal design</li> <li>• Barbed fitting or threaded connection</li> </ul>	<ul style="list-style-type: none"> <li>• Compact design, plastic or die-cast zinc</li> <li>• Barbed fitting or threaded connection</li> <li>• RoHS-compliant designs</li> </ul>	<ul style="list-style-type: none"> <li>• Design with push-in sleeve for push-in fitting QS or threaded connection for solenoid valves CPE</li> <li>• Plastic design</li> </ul>	<ul style="list-style-type: none"> <li>• For solenoid valves VUVB-ST12/valve terminals VTUB-12</li> <li>• Attached via PIN (spring clip), included in the scope of delivery of the valve</li> </ul>
online: →	<a href="#">amte</a>	<a href="#">u</a>	<a href="#">uc</a>	<a href="#">amtc</a>



### Pneumatic silencer

			
Type	<b>Pneumatic silencers UO</b>	<b>Pneumatic silencers UOS-1, UOS-1-LF</b>	<b>Pneumatic silencers UOM, UOMS</b>
Information on silencer insert materials	PE	PE	PU foam
Pneumatic connection	G1/8, G1/4, M7	G1	G1/4, G3/8
Noise level			
Description	<ul style="list-style-type: none"> <li>• Special minimal resistance silencer</li> <li>• For vacuum generator VN</li> <li>• Facilitates trouble-free operation</li> </ul>	<ul style="list-style-type: none"> <li>• For soft-start/quick exhaust valves MS6-SV, MS series</li> <li>• Mounted via male thread</li> </ul>	<ul style="list-style-type: none"> <li>• Silencer and silencer extension</li> <li>• For vacuum generators</li> <li>• Special minimal resistance silencer</li> <li>• Facilitates trouble-free operation of the vacuum generator</li> <li>• Silencer extension for extending the silencer for further noise reduction</li> </ul>
online: →	<a href="#">uo</a>	<a href="#">uos-1</a>	<a href="#">uom</a>

## Air guns



		
<b>Type</b>	<b>Low consumption air gun LSP</b>	<b>Air nozzle LPZ</b>
<b>Exhaust air function</b>	Metered blowing	
<b>Pneumatic connection</b>	female thread G1/4	Male thread M12x1.25
<b>Information on housing materials</b>	Wrought aluminium alloy, PA6 reinforced	Aluminium, brass, die-cast zinc, chromed, nickel-plated
<b>Description</b>	<ul style="list-style-type: none"> <li>• Precise, infinitely variable, lever operated flow metering</li> <li>• Interchangeable nozzles</li> <li>• Pneumatic connection via female thread</li> </ul>	<ul style="list-style-type: none"> <li>• With protective air shield or noise reduction</li> <li>• Targeted, strong air jet or powerful, focused air jet</li> <li>• Low noise level</li> </ul>
<b>online: →</b>	<a href="#">lsp</a>	<a href="#">lpz</a>

## Pneumatic indicators




		
<b>Type</b>	<b>Pressure indicator OH</b>	<b>Pneumatic terminal, end clamp, distributor LT, LTE, LTV</b>
<b>Design</b>	Indicator plate with 16 pressure indicators, indicating pin with spring return, reflection principle	
<b>Size</b>	8, 10, 22	
<b>Operating pressure</b>	-1 ... +8 bar	0.1 ... 8 bar
<b>Pneumatic connection</b>	G1/8, barbed fitting PK-3	barbed fitting PK-3, barbed fitting PK-4, G1/8
<b>Type of mounting</b>	front panel mounting, 2 through-holes in housing or on 2n mounting frame	can be snapped onto mounting rail type NRC-32
<b>Description</b>	<ul style="list-style-type: none"> <li>• Visual indicator</li> <li>• Indicator colours: red, blue, yellow or green</li> </ul>	<ul style="list-style-type: none"> <li>• Pneumatic terminal for checking incoming and outgoing signals at the controller input and output</li> <li>• Up to 15 distributor pieces with a common air supply, for easy connection</li> </ul>
<b>online: →</b>	<a href="#">oh</a>	<a href="#">lt</a>





## Inscription systems

<p>Type</p>	 <p>Inscription label ASLR, BZ, HWF, IBS, KM, KMC, MH, SBS, SIEZ</p>	 <p>Inscription label holder CPV10-VI-ST, CPV14-VI-ST, CPV18-VI-ST, CPVSC1-ST, CPX-ST, IBT, MN2H-BZT, MVH-BZ, VMPA1-ST</p>
<p>Type of mounting</p>	<p>Inscription clip is pressed onto a cable, Pressed into a holder or carrier, through-hole, through-hole</p>	<p>plug-on, snap-in, clamp-on</p>
<p>Height</p>	<p>4.5 ... 11 mm</p>	
<p>Width</p>	<p>9 ... 20 mm</p>	
<p>Description</p>	<ul style="list-style-type: none"> <li>• For labelling items</li> <li>• Can be used in holders or carriers on suitably equipped components</li> </ul>	<ul style="list-style-type: none"> <li>• Holder for inscription labels</li> <li>• For components without pre-assembled carriers</li> </ul>
<p>online: →</p>	<p><a href="#">aslr</a></p>	<p><a href="#">ascf</a></p>





## Control cabinets

	 Factory automation	 Process automation	 Control cabinets for controllers
<b>Technical data</b>	<ul style="list-style-type: none"> <li>• Simple to complex control cabinet designs</li> <li>• Application-specific combination of components</li> <li>• Fully tested, with test certificate</li> <li>• Ready-to-install</li> <li>• Complete documentation</li> <li>• Design conforms to:                             <ul style="list-style-type: none"> <li>– EN 60204-1</li> <li>– ATEX zone 1 and 21 (pneumatic only), ATEX zone 2 and 22 (electric and electro-pneumatic)</li> <li>– UL-508A</li> </ul> </li> <li>• Implementation of safety functions</li> <li>• Different bus technologies</li> </ul>	<ul style="list-style-type: none"> <li>• Simple to complex control cabinet designs</li> <li>• Application-specific combination of components</li> <li>• Different operating voltages possible</li> <li>• Fully tested, with test certificate</li> <li>• Ready-to-install</li> <li>• Complete documentation</li> <li>• Design conforms to:                             <ul style="list-style-type: none"> <li>– EN 60204-1</li> <li>– ATEX zone 1 and 21 (pneumatic only), ATEX zone 2 and 22 (electric and electro-pneumatic)</li> <li>– UL-508A</li> </ul> </li> <li>• Implementation of safety functions</li> <li>• Wide range of bus technologies</li> <li>• Compliance with special cleanliness and hygiene requirements</li> <li>• Special materials</li> <li>• Protected against the ingress of liquids and foreign matter</li> <li>• Heating or cooling elements</li> <li>• Intrinsically safe valve terminal technology</li> <li>• Hot swap inspection window</li> </ul>	<ul style="list-style-type: none"> <li>• Simple to complex control cabinet designs</li> <li>• 1 ... 31 axes</li> <li>• Application-specific combination of components</li> <li>• Use of the latest innovations and technologies</li> <li>• Fully tested, with test certificate</li> <li>• Ready-to-install</li> <li>• Complete documentation</li> <li>• Design conforms to:                             <ul style="list-style-type: none"> <li>– EN 60204-1</li> <li>– ATEX zone 1 and 21 (pneumatic only), ATEX zone 2 and 22 (electric and electro-pneumatic)</li> <li>– UL-508A</li> </ul> </li> <li>• Implementation of safety functions</li> <li>• Wide range of bus technologies</li> </ul>
<b>Description</b>	<ul style="list-style-type: none"> <li>• Control cabinets made to measure</li> <li>• Pneumatic, electric, combined</li> <li>• Individually configured</li> <li>• Adapted to requirements in industrial automation</li> <li>• Design and sizing included</li> </ul>	<ul style="list-style-type: none"> <li>• Control cabinets made to measure</li> <li>• Pneumatic, electric, combined</li> <li>• Individually configured</li> <li>• Adapted to requirements in process automation</li> <li>• Design and sizing included</li> </ul>	<ul style="list-style-type: none"> <li>• Made-to-measure control cabinets for handling systems</li> <li>• Software package for third-party devices included</li> <li>• Individually configurable</li> <li>• Adapted to requirements for handling solutions</li> </ul>
<b>online:</b> →	<a href="#">ready-to-install</a>	<a href="#">ready-to-install</a>	<a href="#">ready-to-install</a>


## Mounting plates and assemblies

	 Mounting plates	 Assemblies
<b>Technical data</b>	<ul style="list-style-type: none"> <li>• Customised support plate shape</li> <li>• Support plate available in different materials</li> <li>• Application-specific combination of components</li> <li>• Fully assembled, connected and wired</li> <li>• Defined interfaces</li> <li>• Ready-to-install</li> <li>• Fully tested, with test certificate</li> <li>• Complete documentation</li> <li>• Design conforms to:                             <ul style="list-style-type: none"> <li>– EN 60204-1</li> <li>– ATEX zone 1 and 21 (pneumatic only), ATEX zone 2 and 22 (electric and electro-pneumatic)</li> <li>– UL-508A</li> </ul> </li> <li>• Implementation of safety functions</li> </ul>	<ul style="list-style-type: none"> <li>• Combination of various pneumatic and/or electrical components to create a single unit</li> <li>• Application-specific combination of components</li> <li>• Accessories mounted on sub-assembly</li> <li>• Use of the latest innovations and technologies</li> <li>• Ready-to-install</li> <li>• Fully tested, with test certificate</li> <li>• Complete documentation</li> <li>• Design conforms to:                             <ul style="list-style-type: none"> <li>– EN 60204-1</li> <li>– ATEX zone 1 and 21 (pneumatic only), ATEX zone 2 and 22 (electric and electro-pneumatic)</li> <li>– UL-508A</li> </ul> </li> <li>• Implementation of safety functions</li> </ul>
<b>Description</b>	<ul style="list-style-type: none"> <li>• Machine-specific pre-assembly of pneumatic and electrical components on support plate</li> <li>• Tubing and wiring included</li> <li>• Defined interfaces for simple installation directly in the system</li> </ul>	<ul style="list-style-type: none"> <li>• Pneumatic and electrical components pre-assembled to create a function unit</li> <li>• Can be combined from around 30,000 catalogue components</li> <li>• Connections included</li> <li>• For integration in machines</li> </ul>
<b>online:</b> →	<a href="#">ready-to-install</a>	<a href="#">ready-to-install</a>



## Integration solutions

Type	 Manifold duct plates	 Cartridge solutions	 Sheet-metal constructions and special housings	 Function blocks
Technical data	<ul style="list-style-type: none"> <li>• Shape of manifold duct plate freely selectable</li> <li>• Combination of over 30,000 catalogue components</li> <li>• High density of components</li> <li>• No tubing</li> <li>• Variable positioning of mechanical, pneumatic and electrical interfaces</li> <li>• Integration of customised components</li> <li>• Available with protective cover</li> <li>• Fully tested</li> <li>• Ready-to-install</li> <li>• Complete documentation</li> <li>• Implementation of safety functions</li> </ul>	<ul style="list-style-type: none"> <li>• Space-saving thanks to extremely compact design</li> <li>• Pneumatic functions integrated in a single compact housing</li> <li>• Housing available in different materials</li> <li>• No tubing required</li> <li>• Minimal cabling required</li> <li>• Significant design freedom</li> <li>• Variable integration options on and within the machine</li> <li>• Sturdy design</li> <li>• Fully tested</li> <li>• Ready-to-install</li> <li>• Complete documentation</li> </ul>	<ul style="list-style-type: none"> <li>• Sheet-metal constructions                             <ul style="list-style-type: none"> <li>– Customised shape and size</li> <li>– Reduced weight and number of assembly parts</li> </ul> </li> <li>• Special housing                             <ul style="list-style-type: none"> <li>– Customised shape</li> <li>– Customised dimensions</li> <li>– Different materials</li> <li>– Compact, space-saving format</li> <li>– Protection against environmental influences and unauthorised access</li> </ul> </li> <li>• In combination                             <ul style="list-style-type: none"> <li>– Alternative to conventional control cabinets</li> <li>– Variable integration options on and within the machine</li> <li>– Short tubing and cable lengths</li> <li>– Attractive design</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• No tubing required thanks to drilled ducts</li> <li>• Housing available in different materials</li> <li>• Customised design of the pneumatic interfaces for the system</li> <li>• Ideal for a small number of components and variable connection options</li> <li>• Extremely economical, even for small quantities</li> </ul>
Description	<ul style="list-style-type: none"> <li>• Ideal for a large number of pneumatic connections in an extremely compact space</li> <li>• No tubing</li> <li>• Compact</li> <li>• Easy to service</li> <li>• Not subject to malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Integration of various pneumatic functions in one component</li> <li>• No need for single housings</li> <li>• Ideal for applications that require a highly compact design</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced weight thanks to optimal material utilisation with sheet-metal construction</li> <li>• Protection against environmental influences and unauthorised access</li> <li>• Ideally combined as a control cabinet directly in the system</li> </ul>	<ul style="list-style-type: none"> <li>• Compressed air supply for pneumatic components via drilled ducts</li> <li>• Ideal for a small number of pneumatic components and variable connection options</li> <li>• Compact and easy to service</li> </ul>
online: →	<a href="#">ready-to-install</a>	<a href="#">ready-to-install</a>	<a href="#">ready-to-install</a>	<a href="#">ready-to-install</a>





## Integration solutions

Type	 Profile solutions
Technical data	<ul style="list-style-type: none"> <li>• Profiles in customised cross sections and lengths</li> <li>• Integrated ducts for straight-line routing of the compressed air</li> <li>• Common air supply for multiple valves or valve terminals via a single duct</li> <li>• Combination of exhaust air and supply air without tubing, even over long distances</li> <li>• Supply of compressed air at different locations</li> <li>• No tubing required</li> <li>• Significantly reduced cabling</li> <li>• Modular structure easy to achieve</li> <li>• Optional: profile as mechanical mounting element for other components or as a supporting part of the machine frame</li> </ul>
Description	<ul style="list-style-type: none"> <li>• Extruded profiles in combination with valves as a valve terminal</li> <li>• For the distribution of compressed air in the machine concept</li> <li>• Customised profile cross sections available</li> </ul>
online: →	<a href="#">ready-to-install</a>

## Operating phase

		
<p>Type</p>	<p>Maintenance</p>	<p>Repair service</p>
<p>Services</p>	<p>Implementation of the following preventive maintenance measures to DIN 31051:</p> <ul style="list-style-type: none"> <li>• Inspections                             <ul style="list-style-type: none"> <li>– Checking for damage and wear characteristics</li> <li>– Checking of mechanical, pneumatic and electrical connections and connectors</li> <li>– Checking of lubrication</li> <li>– Checking of compressed air preparation</li> <li>– Carrying out of component-specific inspections</li> </ul> </li> <li>• Maintenance                             <ul style="list-style-type: none"> <li>– Lubrication/relubrication of guides</li> <li>– Tightening of connectors</li> <li>– Replacement of air filters</li> <li>– Replacement of silencers</li> <li>– Carrying out of component-specific preventive maintenance tasks</li> </ul> </li> <li>• Repair                             <ul style="list-style-type: none"> <li>– Troubleshooting</li> <li>– Solution finding</li> <li>– Error elimination</li> <li>– Elimination of leakages</li> <li>– Replacement or repair of components</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Inspection</li> <li>• Analysis of economic efficiency</li> <li>• Repair or replacement of faulty components or wearing parts</li> <li>• Leakage testing</li> <li>• Functional test</li> </ul> <p>Please send the faulty component and a detailed error description to your Festo national company. Detailed spare parts lists can be found on the Festo website.</p>
<p>Description</p>	<ul style="list-style-type: none"> <li>• Preventive and corrective maintenance</li> <li>• Directly on your system</li> <li>• For high machine availability and rapid assistance should the worst happen</li> </ul>	<ul style="list-style-type: none"> <li>• Send high-quality components and assemblies to Festo for repair</li> <li>• Extended service life</li> <li>• Reduced costs</li> </ul>
<p>online: →</p>	<p><a href="#">services</a></p>	<p><a href="#">services</a></p>

## Energy Saving Services

Type	 Compressed air production energy analysis	 Compressed air consumption analysis	 Compressed air quality analysis	 Leakage detection
<b>Services</b>	<ul style="list-style-type: none"> <li>• Measurement of compressor operating times as well as load/idling times</li> <li>• Current consumption measurement</li> <li>• Flow measurement/consumption measurement</li> <li>• Pressure measurement (level and tube size)</li> <li>• Estimate of leakage volume</li> <li>• Comparison of energy consumption and compressed air volume supplied</li> </ul>	<ul style="list-style-type: none"> <li>• Installation and removal of the measuring equipment with standard components (fittings, tubing, etc.)</li> <li>• Measurement of flow rate, consumption and pressure with machine running and when idle</li> <li>• Determination and analysis of different characteristics                             <ul style="list-style-type: none"> <li>– Consumption per machine cycle</li> <li>– Average consumption per minute</li> <li>– Average pressure</li> <li>– Max./min. pressure</li> <li>– Max./min. rate of air flow</li> </ul> </li> <li>• Documentation of measurement results including graphical representation of measurement results, optionally available as PDF file or colour printout</li> <li>• 3 hours on-site service (additional time on request)</li> </ul>	<ul style="list-style-type: none"> <li>• Inspection of decentralised air preparation at point of usage</li> <li>• Measurement of residual oil content up to class 2 (ISO 8573-1:2010)</li> <li>• Measurement of pressure dew point up to class 2 (ISO 8573-1:2010)</li> <li>• Analysis of measurement results and recommendation of improvement measures (if applicable)</li> <li>• Documentation of all measurement results</li> <li>• 3 hours on-site service (max. 3 measurements; additional time on request)</li> </ul>	<ul style="list-style-type: none"> <li>• Detection of compressed air leakages using highly sensitive ultrasonic detectors during operation</li> <li>• Checking of the complete compressed air system from the compressor to the pneumatic application</li> <li>• Classification of the leakages according to size and cost</li> <li>• Documentation of faulty components as well as of the type and cause of fault</li> <li>• Leakage report                             <ul style="list-style-type: none"> <li>– Recommended measures</li> <li>– Spare parts required</li> <li>– Estimation of repair time</li> <li>– Prioritisation of measures</li> <li>– Assessment as to whether repair can be carried out while machine is in operation</li> </ul> </li> <li>• Information on optimisation options</li> <li>• Documentation of measures carried out</li> </ul>
<b>Description</b>	<ul style="list-style-type: none"> <li>• Energy Saving Services – the service package for energy efficiency</li> <li>• Identification and optimum utilisation of potential savings for compressed air</li> <li>• Save up to 60% on compressed air costs</li> <li>• Energy saving begins with the compressor</li> </ul>	<ul style="list-style-type: none"> <li>• Determination of exact compressed air consumption</li> <li>• Optimal configuration of compressed air supply</li> <li>• No pressure drop due to undersupply</li> <li>• No unnecessary energy costs due to oversupply</li> </ul>	<ul style="list-style-type: none"> <li>• Optimisation of compressed air quality</li> <li>• Increased service life of components</li> <li>• Reduction of maintenance costs</li> </ul>	<ul style="list-style-type: none"> <li>• Detection and repair of leakages in production plants</li> <li>• Immediate energy and operating cost savings</li> </ul>
<b>online:</b> →	<a href="#">services</a>	<a href="#">services</a>	<a href="#">services</a>	<a href="#">services</a>

## Wide range of industry sectors? One competent partner.

FESTO

Festo is your first-choice partner for automation in a wide range of industry sectors. Our experts successfully develop products and solutions for over 50 different industry sectors. This is thanks to their precise knowledge of the processes and specific requirements involved in each individual industry.

### Your added value

- A contact with in-depth knowledge of the industry
- Industry-specific products and solutions
- Customised to meet specialist requirements, e.g. hygiene regulations, explosion prevention and protection, environmental conditions, laws, standards, etc.

## Laboratory automation



- Understanding processes: from identifying specimen holders and repositioning test tubes, right on up to feeding liquids
- Developing solutions: from collaborative engineering through to delivering the ready-to-install solution
- Creating synergies: everything from a single source

→ [www.festo.com/laboratory](http://www.festo.com/laboratory)

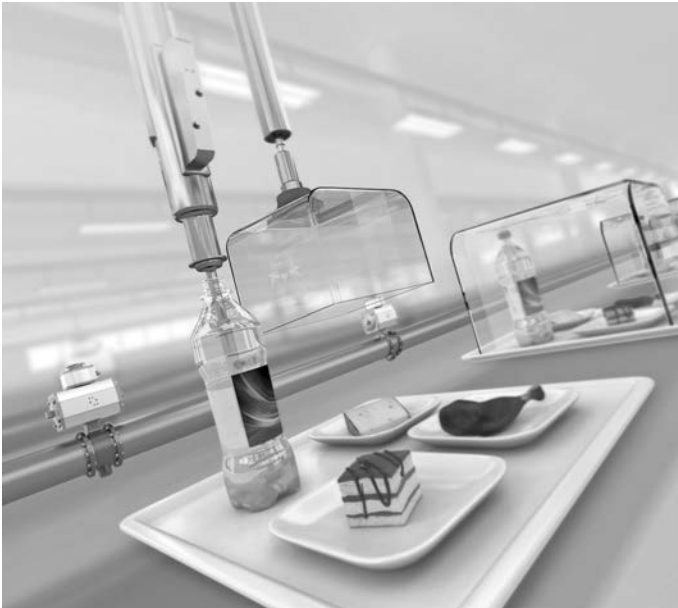
## Medical technology



- Applications for medical devices: dialysis, oxygen therapy, ophthalmology, dental service units, training torsos and medical mattresses
- Gas and liquid handling, handling systems as ready-to-install solutions
- Product development is carried out based on ISO 13485 and the specifications of the FDA

→ [www.festo.com/medtech](http://www.festo.com/medtech)

## Food and beverage industry



- Partner for automation: from continuous processes through food and splash zones right up to end-of-line packaging
- Collaborative engineering
- **Food safety:** food safety requirements implemented with hygienic products and solutions

→ [www.festo.com/food](http://www.festo.com/food)

## End-of-line packaging



- For maximum productivity for secondary and tertiary packaging: from labelling, erecting cartons, loading boxes and shrink wrapping to palletising
- Our technology mix for you: electrical, pneumatic, servopneumatic
- Components, individual solutions and services for your tasks

→ [www.festo.com/packaging](http://www.festo.com/packaging)

Wide range of industry sectors? One competent partner.

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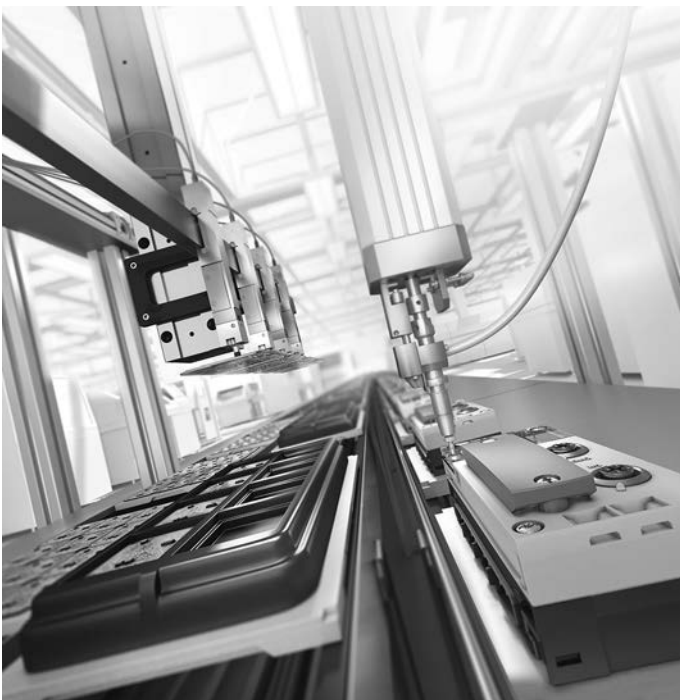
### Automotive industry and tier-1 suppliers



- Along the entire production process
- Understanding the processes – from the press shop through to engine and gearbox production and tier-1 suppliers
- Developing solutions – collaborative engineering
- Creating synergies – everything from a single source

→ [www.festo.com/automotive](http://www.festo.com/automotive)

### Small parts assembly and electronics

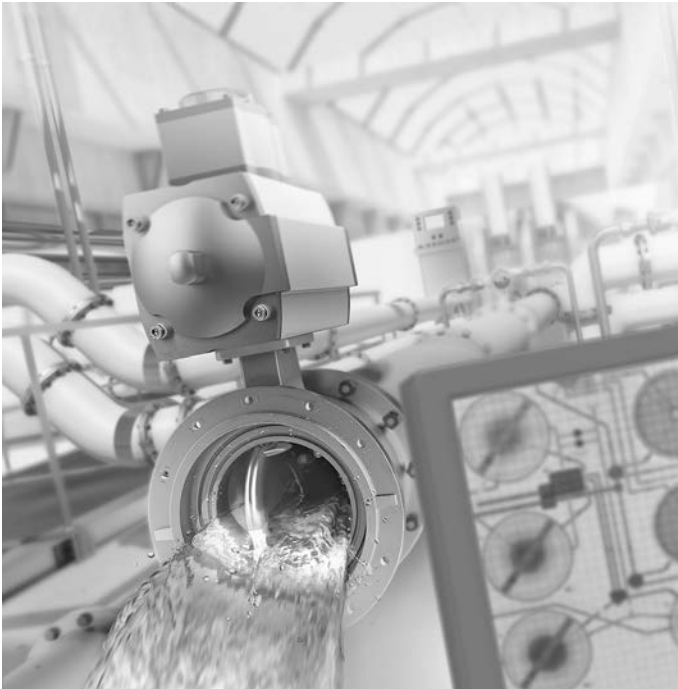


- Know-how along the entire process chain
- From wafer production at the front end to finished chips at the back end
- In small parts assembly, electronic or non-electronic
- For quality inspection and packaging of the finished products
- Ready-to-install handling systems

→ [www.festo.com/ela](http://www.festo.com/ela)



## Water technology



- Integrated automation solutions for the key processes: water treatment and wastewater treatment
- Customer-oriented consulting and engineering
- Delivery of components and ready-to-install systems
- Compressed air quality analyses
- Energy Saving Services

→ [www.festo.com/water](http://www.festo.com/water)

## Biotech, pharma and cosmetics industry



- Integrated automation solutions for the key processes: production of ingredients, manufacturing of pharmaceuticals, cosmetics and personal care products, filling and packaging
- Customer-oriented consulting and engineering
- Delivery of components and ready-to-install systems
- Compressed air quality analyses
- Energy Saving Services

→ [www.festo.com/biotech](http://www.festo.com/biotech)

## What must be taken into account when using Festo products?

The limit values specified in the technical data and any specific safety instructions must be adhered to by the user in order to ensure correct functioning.

When using pneumatic components, ensure that they are operated using correctly prepared compressed air without aggressive media and that they comply with environmental specifications (e.g. climate).

When Festo products are used in safety-oriented applications, all national and local laws and regulations, for example the Machinery Directive, together with the relevant references to standards, trade association rules and the applicable international regulations must be observed and complied with.

Unauthorised conversions or modifications to products and systems from Festo constitute a safety risk and are thus not permitted. Festo does not accept any liability for the resulting damages.

You should contact Festo if one of the following applies to your application:

- The ambient conditions and conditions of use or the operating medium differ from the specified technical data.
- The product is to perform a safety function.
- A risk or safety analysis is required.
- You are unsure about the product's suitability for use in the planned application.
- You are unsure about the product's suitability for use in safety-oriented applications.

All technical data are correct at the time of going to print.

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